ARCHIVES OF OPHTHALMOLOGY.

ON REFRACTION AT A TORIC SURFACE.

By H. C. LOMB, ROCHESTER, N. Y.

(*With five figures in the text.*)

WITH the increasing use of toric lenses in ophthalmological practice, it becomes of importance to inquire closely into the refraction at toric surfaces if the maximum efficiency is to be obtained, particularly as the general problem—namely, that of tracing analytically the course of *any* ray or pencil when refracted at such a surface—

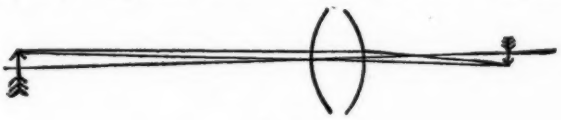

FIG. 1.

does not as yet appear to have been solved. The case usually alone considered is that of rays, or pencils, traversing the region immediately adjacent to the optical axis of the

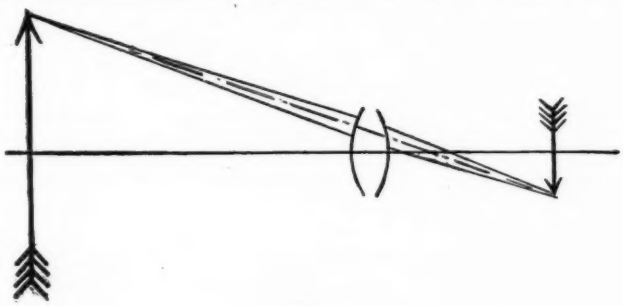

FIG. 2.

lens (Fig. 1), thus leaving out of account the light incident

on the peripheral portions of the lens and such coming from parts of the field of view other than the centre (Fig. 2). But it is exactly on account of their action on the last-mentioned rays and pencils that toric lenses have their peculiar significance; the presence of these extra-axial rays cannot, therefore, be disregarded with impunity.

Before studying the refraction at toric surfaces, we must seek to obtain an accurate notion of the nature of the surface itself.

The toric surface may be considered to be generated by a circle rotating about an axis in its own plane; in the pneumatic tire of automobiles we have a familiar example. In Fig. 3 the generating circle is shown in two positions, the axis of rotation being assumed vertical.

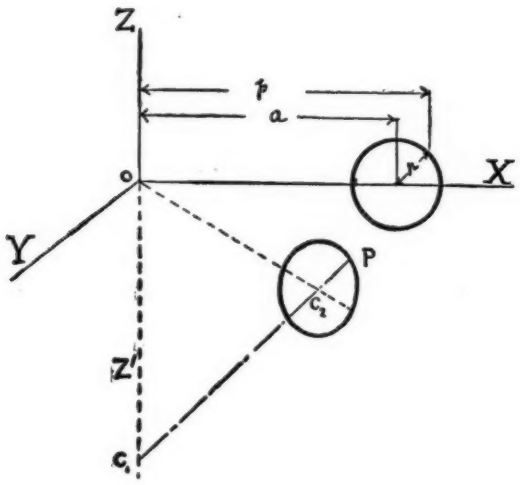

FIG. 3.

We introduce a system of rectangular co-ordinates, X, Y, Z, and take as axis of Z the axis of rotation just mentioned. Let r be the radius of the generating circle and a the distance of its centre from the origin of co-ordinates O. Then

evidently the co-ordinates x, y, z of any point P on the surface will be joined by the relation

$$z^2 = r^2 - (\sqrt{x^2 + y^2} - a)^2 \qquad (1)$$

This is the equation of the toric surface.

We may note in passing that for $a = o$, equation (1) reduces to the equation of a sphere:

$$x^2 + y^2 + z^2 = r^2$$

The sphere is thus a special case of the torus.

From the mode in which the toric surface is generated, it is plain that its curvature varies in different planes or "meridians." A convenient and exact method of treating such surfaces is to imagine it divided into small elements and to consider their normal sections—that is to say, to erect the normal to the surface at any point to be considered and, by passing planes through the normal in different directions, to examine the sections of the surface-element made by these planes. The aggregate of all these sections at any point gives a true picture of the surface in the neighborhood of that point, and the study of the surface is reduced, as it were, to that of plane curves.

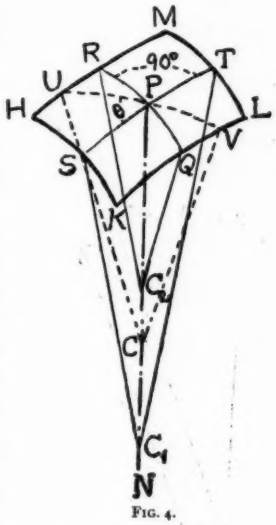

FIG. 4.

Each of these normal sections will, in general, exhibit a different curvature, but among all the values so found, there will be one whose curvature is less and one whose curvature is greater than any other, and, according to a well-known theorem, these two sections or planes of maximum and minimum curvature are perpendicular to each other. They are called principal sections, and the radii of curvature of the curves cut out of the surface by them, are called the principal radii of curvature of the surface at the point in question.

In Fig. 4, HKLM represents a small element of the

surface about a point *P*, PN the normal to the surface at *P*, SPT and RPQ the principal sections, C_1P and C P the principal radii of curvature of the surface, measured, of course, along the normal PN. If $C_1P = \varsigma_1$ be the maximum, and $C_2P = \varsigma_2$ be the minimum radius of curvature, then, as is shown in the general theory of surfaces, the radius of curvature $CP = \varsigma$ of any other normal section, as UPV, making an angle $UPS = \theta$ with the plane of ς is given by the equation

$$\frac{1}{\varsigma} = \frac{\cos^2\theta}{\varsigma_1} + \frac{\sin^2\theta}{\varsigma_2} \qquad (2)$$

Thus, as soon as the principal radii of curvature ς_1 and ς_2 are known, the curvature of any other given normal section may be determined and the surface is completely characterized about the point considered.

Let us now apply these theorems, which hold for any surface, to the case of the torus. It is clear from the manner of generating the torus, and it may be shown mathematically, that the *direction* of the normal at any point *P* (Fig. 3) is given by the radius C_2P of the generating circle drawn to the point *P*; and further, that this radius is *itself* one of the principal radii of curvature, viz., the *minimum* radius of curvature. From simple geometrical considerations it is also evident, and may again be analytically demonstrated, that the *maximum* radius of curvature is given by that portion of the normal, C_1P in Fig. 3, included between the point *P* on the surface and the axis $Z\,Z^1$ of the surface. For all points at a given distance, *p*, from the axis, this maximum radius is obviously the same. From similar triangles we have (Figs. 3 and 5):

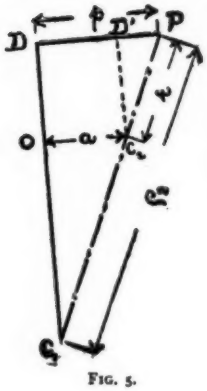

Fig. 5.

$$\frac{C_1P}{DD} = \frac{C_2P}{D^1P},$$

or

$$\frac{\varsigma_1}{P} = \frac{r}{p-a}.$$

We therefore find for the *principal radii of curvature of the toric surface* in any point (x, y, z):

$$\varsigma_1 = \frac{pr}{p-a} \qquad \varsigma_2 = r \qquad (3)$$

where $p = \sqrt{x^2+y^2}$;

and for the radius of curvature of any other normal section at this point making an angle θ with the plane of ς_1:

$$\frac{1}{\varsigma} = \frac{(p-a)\cos^2\theta}{pr} + \frac{\sin^2\theta}{r}$$

$$= \frac{1}{r}\left\{1 - \frac{a\cos^2\theta}{p}\right\} \qquad (4)$$

Having examined the nature of the toric surface itself, we are now prepared to inquire into its refractive action. From the law of refraction we know that when a ray impinges upon any surface, this incident ray and the corresponding refracted ray lie in the same plane, namely, in the plane determined by the incident ray itself, and the normal to the refracting surface at the point of incidence. This plane, called the plane of incidence, is evidently one of the "normal sections" referred to above. In this plane, in the immediate vicinity of the point of incidence, the surface acts like a spherical surface having a radius equal to the radius of curvature of the toric surface in this plane, which curvature may be found from equation (4).

We have thus reduced the refraction at a toric surface to the refraction at a spherical surface.

A further discussion of the above, together with some interesting applications, must be reserved for a future occasion.

QUININE AMAUROSIS WITH REPORT OF A CASE.[1]

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(*With two colored plates.*[2])

SOON after the isolation of the alkaloid quinine from the Peruvian bark by Pelletier and Caveuton in 1820, visual and aural disturbances were noted after large doses of the alkaloid and its salts. The first record we have was by Berandi, published in Milan in 1829; he experimented on men with the sulphate of quinine and noted headache and the effect on the eyes and ears. Beydler noted temporary amaurosis after a dose of forty grains of the sulphate. Giaconimi published the first complete report. The patient, having taken one hundred and eighty grains of the sulphate, became unconscious, deaf, and blind, remaining so for a prolonged period. Von Graefe recorded the first ophthalmoscopic examination in two cases of partial amblyopia, the fields and fundus being normal.

The first case of quinine amaurosis, as we understand it at present, was described by Roosa in 1879; his case took the tincture of the bark. It has been proved by experiments that any of the alkaloids of quinine will produce amaurosis, but the sulphate is the most active. That the drug has a selective effect upon the optic nerve and retinal circulation has been proven by the experiments of de Schweinitz on animals and of Barabaschew upon healthy men.

[1] Read at the meeting of the Ophthalmological Section of the New York Academy of Medicine, March 19, 1906.

[2] These plates were not received from Germany in time for publication with the paper in this number of the ARCHIVES. They will appear in the next (November) issue.—ED.

In many of the cases reported the dose is indefinite, varying from twelve grains to an ounce in twenty-four hours, resulting in pallor of the disk, vasculitis, contraction of the retinal arteries, and contracted fields which remained so with central vision normal.

The case to which I ask your attention seems of especial interest because the patient had no idiosyncrasy for the drug, the exact dose was known, and an exceptional opportunity was afforded for following the case and studying the ocular changes from perception of light to normal telescopic vision.

Mr. J. H., age forty-three, an architect and builder, was admitted to the Presbyterian Hospital on June 4, 1905, in a condition of stupor, irregular and rapid respiration, and occasional periods of collapse, with the following history: had been under a physician's care for bronchial pneumonia, and by a misunderstanding of orders had taken forty-eight five-grain capsules of quinine sulphate in twelve hours, a total of two hundred and forty grains during the night of June 3d. He awoke the next morning with terrific noises in his ears, loss of sight, and delirium alternating with collapse. Examined on June 8th. I found the pupils wide dilated, no reaction to light, cornea slightly hazy and marked hyperæsthesia, tension minus two, and perception of light; as far as I was able to test him in his condition his hearing was normal; he had not complained of noises or deafness since the first twenty-four hours after taking. Fundus examination, right eye, showed the following: extreme pallor, nerve pearly white, thrombus of the inferior branch of the retinal vein, the blood column broken in places, endoarteritis of the large branches and obliteration of the small arteries, veins dilated. The iris was very dull in appearance and showed no reaction to light. The left fundus showed the same condition except the thrombus was of the superior branch of the retinal vein. The patient was put at once on the following: nitroglycerine $\frac{1}{75}$ grain every four hours, amyl nitrite *2m* three times a day, strychnia nitrate $\frac{1}{60}$ gr. Hypodermic once a day, increasing $\frac{1}{}$ each dose up to $\frac{1}{10}$.

June 11th.—General condition much improved; able to give intelligent answers and seemed interested in surroundings; counts fingers at three feet with each eye.

June 13th.—Pupils widely dilated, no reaction to light or

accommodation, tension minus 2, hyperæsthesia of the cornea, circulation established in small arteries around the disk, nerve a better color, counts fingers and recognizes objects at five feet with each eye.

June 15th.—Pupils smaller, no reaction to light (anastomosis of the small arteries about the disk), tension minus 1, counts fingers at eight feet.

June 17th.—Pupils smaller and react slightly to accommodation, not to light; counts fingers at sixteen feet.

June 19th.—Pupils react to light, tension minus 1, circulation well established in region of disk, veins normal. Vision $\frac{20}{200}$ each eye.

June 20th.—Tension slightly minus, pupils react to light, vision $\frac{20}{40}$ each eye.

June 24th.—Vision $\frac{20}{40}$, reads Jaeger number 4 at 3 feet. Circulation well established by enlargement and anastomosis of the small arteries. Amyl nitrite and nitroglycerine stopped.

June 30th.—Tension normal, vision $\frac{20}{30}$, pupillary reaction good. Reads Jaeger No. 2 at 3 feet. Discharged from the hospital, treatment discontinued except $\frac{1}{60}$ gr. strychnia three times a day. The fields were taken and were as follows:

Right eye.	Superior	10	Left eye.	Superior	10
	Inferior	30		Inferior	32
	Nasal	18		Nasal	30
	Temporal	20		Temporal	30

The color fields are shown in the charts (see note page 420). The patient was next seen by me on Sept. 22, 1905; he had gained thirty three pounds in weight, general health good, only discomfort with eyes is not seeing well at night and only seeing straight ahead as he expressed it. Vision was telescopic and $\frac{20}{30}$ in each eye. Pupillary reaction and tension normal. The fields slightly larger and more regular than on June 30, 1906.

The experiments of de Schweinitz on dogs were to determine the lesion of quinine amblyopia and the effect of the different salts of the drug; hypodermic injections in varying doses were given the animals; thrombosis of the central vein was seen in one case, optic atrophy, marked contraction of the arteries, and changes similar to those seen in the human subject. The effect was best obtained by using the bimurate of quinine; his experiments proved that large doses of quinine produced atrophy of

the optic nerve, thrombus and endovasculitis of the blood-vessels. The symptoms are very well marked and fairly constant: sudden blindness, pallor of the optic nerve resembling atrophy, very marked contraction of the retinal arteries, contraction of the visual field, dilatation of the pupils, and color blindness. Nystagmus was noted by Roosa, anæsthesia of the cornea by Voorhies, and Tiffany records increased tension. It is to be noted in the case I am reporting that the tension was lowered, with marked hyperæsthesia of the cornea; the ear symptoms were noted during the first twenty-four hours only.

The prognosis in these cases is good, depending on the dose and the idiosyncrasy of the case. Normal telescopic vision has been the final result in the majority of cases reported, with contraction of the fields, which is permanent.

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A CASE OF MICROPHTHALMUS WITH UPPER-LID CYST.

CLINICAL REPORT BY DR. CHARLES H. MAY; PATHOLOGICAL REPORT BY DR. WARD A. HOLDEN.

(*With six figures on Text-Plates XII. and XIII.*)

Clinical Report.

The patient, William Gordon, was born December 21, 1904; precipitate labor, full term; mother has tuberculosis; mother's eyes normal.

Present Condition (December 28, one week after birth): The right eye appears normal. The left eye presents a large cystic protrusion, pink in color, occupying the entire palpebral aperture and appearing to consist of the everted conjunctival surface of the upper lid. (Fig. 1, Text-Plate XII.) The cystic mass measures 18*mm* in width, 12*mm* in height, and projects 10*mm*. Upon puncture with a hypodermic needle there is an escape of a single drop of clear, yellow fluid, without any apparent reduction in the size of the cyst. The lids can be separated with difficulty by the aid of retractors, and when this is done it is seen that the protrusion is attached to the upper lid. When the cystic mass is raised with a lid retractor and the lower lid drawn down, a microphthalmic globe can be seen. The cornea measures 7*mm* in width and 6*mm* in height, is flattened, but perfectly transparent; the iris presents an eccentric, pear-shaped pupil, with the narrow extremity pointing upward and inward; there is a complete posterior synechia; the area of the pupil is grayish and opaque (cataract), so that no view of the interior of the eye can be obtained.

Five months later (May 3, 1905) the conditions were the same,

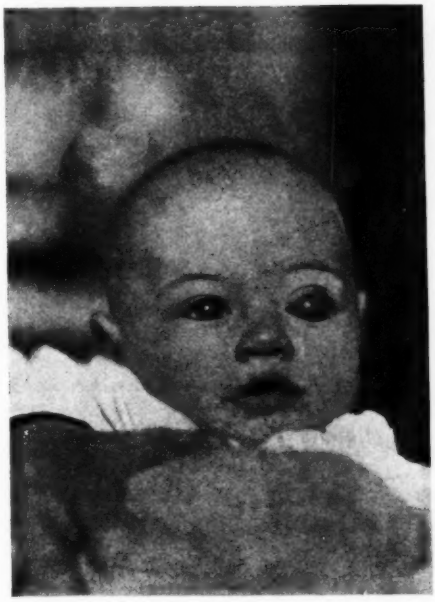


FIG. 1. Head of the child, with the cyst in the left upper lid.

FIG. 2. Upper-lid cyst. Natural size.

FIG. 3. The pedicle of the tumor, showing proliferating large cells at various points on its outer surface and numerous rosettes near these points; Nissl stain.

excepting that the mass had grown slightly, and now measured *20mm* in breadth, *14mm* in height, and projected *12mm*.

Operation, June 8, 1905.—Under chloroform anæsthesia, the conjunctiva covering the cyst was divided transversely and separated from the mass by blunt dissection. The separation was effected quite readily everywhere, excepting over an area about *4mm* in diameter, where there was a direct connection between the mass and the eyeball. The situation of this attachment was practically at the equator of the eyeball and about *3mm* above its horizontal meridian. This connecting portion was of dark color, and was found upon division to be formed partly of pigmented and partly of non-pigmented tissue. At the seat of the attachment a probe could be passed into the eyeball for a distance of *15mm*, but it was impossible to determine whether between the tunics of the eyeball or into the vitreous.

July 19, 1906.—The microphthalmic eyeball has enlarged since the last note, and there is not a great deal of difference in the size of the globe on the two sides. The left cornea measures *8mm* in the horizontal and *7mm* in the vertical diameter; the right cornea measures *12mm* in the horizontal diameter. The width of the palpebral aperture is *20mm* on the left side and *24mm* on the right.

Pathological Report.[1]

There was a small eyeball without coloboma of the iris and with a cataractous lens. From a point on its upper-inner surface, near the equator, issued a narrow stalk which expanded into a large tumor lying behind the upper lid (Fig. 2, Text-Plate XII.). This tumor was removed by Dr. May from the patient, a boy of six months, and since then the eyeball has grown until a year after the operation it is nearly normal in size. Lower-lid tumors are common enough, but the upper-lid tumors have been seen only a few times (Purtscher, Snell, Parsons, Collins).

Development.—Evidently a knuckle of the secondary optic vesicle forced its way upward into the overlying mesoblast and, continuing to develop in extent, formed a mass of folded rudimentary retina which is surrounded by a fibrous sheath continuous with the sclera. The stalk is a tube of retina with a narrow lumen connecting the cleft-like cavities of the tumor with the vitreous

[1] Presented at the meeting of the American Ophthalmological Society, June, 1906.

chamber of the eyeball (Fig. 3). The lumen surface corresponds to the inner surface of the retina within the eye. The stalk is surrounded by a layer of pigment continuous with the pigment epithelium, and is enclosed in a fibrous sheath continuous with the sclera.

On passing from the stalk into the tumor proper the relations of retina, pigment epithelium, and outer fibrous coat are modified. There has been an invagination and a folding of the retina, so that what corresponds to the outer surface of the retina lines many of the clefts in the tumor as if it were the inner surface of the retina (Fig. 4, Text-Plate XIII.). The pigment epithelium surrounding the outer surface of the retina has mostly disappeared, and the fibrous coat and the retina pass one into the other without any line of demarcation.

But where a fold in the retina has allowed the fibrous sheath to pass into the central portion of the tumor, pigment epithelium has in several places been carried in also, and now lies in an anomalous position as regards the retina.

The rudimentary retina in this case is composed simply of a network of glia fibres and scattered nuclei, enclosing numbers of ganglion cells, large and small. There is no division into layers and there are no distinct outer and inner limiting membranes.

The feature of this case to which I wish to call attention is the presence of numbers of the rosette formations which are found in some gliomas and in some retinas of arrested development, which were considered neuro-epithelial formations analogous to the rods and cones by Flexner and by Wintersteiner, who first independently described them. Since then Ginsberg, Brown Pusey, and Verhoeff, among others, have studied these rosette formations. There has been considerable discussion as to the nature of their component cells. Their genesis and development are well shown in this case. Here the primitive neuro-epithelial cells, which compose the inner layer of the secondary optic vesicle, have become differentiated into spongioblasts and neuroblasts, which, attaining their full development, have formed, on the one hand, glia cells and fibres, and, on the other, ganglion cells. Of these elements, jumbled together without definite arrangement, this rudimentary retina is chiefly made up.

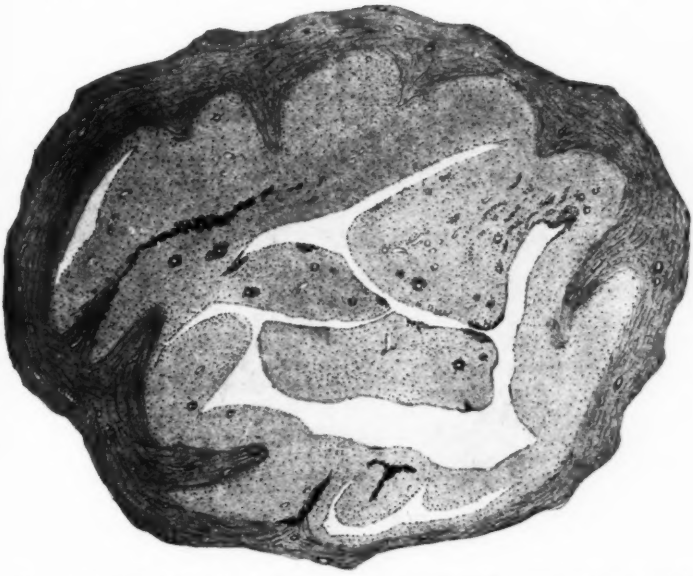
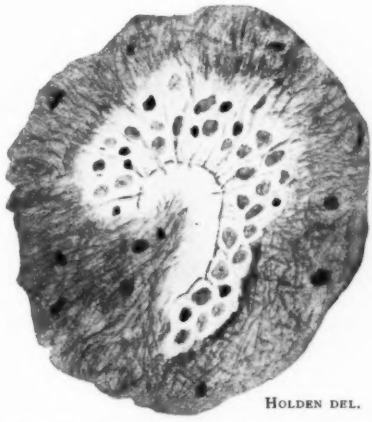


FIG. 4. A section through the middle of the tumor. The outer portion connective tissue, the inner rudimentary retina.

FIG. 5. Large cells growing inward from the outer surface of the retina to form a rosette.



HOLDEN DEL.

FIG. 6. An almost complete rosette surrounded by ordinary glia tissue.

But here and there along the margins of the retina are single cells, or groups of cells, with large nuclei and large bodies which are to be considered embryonic retinal cells which have not yet developed. Now at various points on the outer surface of the retina these cells have proliferated, and, assuming a spindle form, have pushed perpendicularly into the retina like ependyma cells, and then have formed what in sections appear as spirals or as circles with a fine basal membrane, through which the large basal cells send filaments into the cavity (Figs. 5 and 6 Text-Plate XIII.). Rows of smaller cells, gradually assuming the characteristics of ordinary glia cells, surround the large basal cells, and the rosette is formed. The larger cells push into the neuroglia tissue without being directly connected with it, but the smaller peripheral cells in the rosettes send their processes out into the neuroglia with which they are in intimate connection.

The principal cells in these rosettes are seen to develop atypically from embryonic cells which in their natural course would have become rods and cones.

A TIME-SAVING ADDITION TO TEST-TYPE CARDS.

By HOLBROOK LOWELL, M.D., Boston, Mass.,

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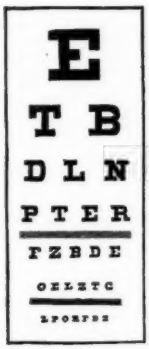
(With one figure on Text-Plate XIV.).

THOSE who have had much experience in the refraction rooms of large ophthalmic hospitals will recall the difficulty encountered and the time lost in trying to get patients to read the test-card letters in order, or even at all. When a patient is asked to read the *lowest line he can*, he invariably says: "I can't read the lowest line, doctor!" You ask him to read the letters from the top down, and he reads to the third or fourth line, then begins to call off the *numbers* of the lines. Again, when asked to read the third line from the bottom, he says that he can't read it, but later, with a little coaxing, he reads it perfectly well. He was too nervous to count up three lines from the bottom. Many mechanical test-type cards have been devised to meet these difficulties, and they serve very well in the office, but are not so practical for hospital use, because of their complication or expense. Some two months ago the writer thought of a very simple device, which has proved to work equally as well in the hospital as in the office. A strip of gummed green paper, 1*cm* wide, is pasted just below the $\frac{20}{60}$ line on the test-type (Snellen) card, and a strip of gummed red paper, 1*cm* wide just below the $\frac{20}{30}$ line. (See illustration.) Now you will see that we have green and red lines on the test-type card, each line being between two important test-type lines. In the office, patients usually will voluntarily say that they can

ILLUSTRATING DR. HOLBROOK LOWELL'S ARTICLE
ON TEST-TYPE CARDS



read the letters either above or below the red or green line. In the hospital it was seldom necessary to point out the letters, as was often the case before the colored lines were used. There is no confusion when you ask a patient to read either just above or just below one of the colored lines. Experience shows that these colored lines, besides fixing the patient's attention on the letters you wish him to read, give a useful hint as to the patient's color perception. By actual comparison with the newer test-type cards, having lines indicated by the large numbers, the writer has found that his device of the colored lines is very much less confusing to the average patient. He has therefore been led to report this little device because of his confrères' kindly approbation and enthusiastic use of it, and he hopes that it may serve to eliminate one of the tiring features of clinic and office vision-testing.

ABSTRACT REPORT OF THE SECTION ON OPHTHALMOLOGY OF THE AMERICAN MEDICAL ASSOCIATION.

BOSTON, MASS., JUNE 5–8, 1906. THE CHAIRMAN, DR. LEWIS H. TAYLOR, WILKESBARRE, PA., PRESIDED.

Chairman's Address: Dr. Taylor said that to present a resumé of the programme of Ophthalmology during the past year would take up more time than should be allotted to an introductory address, and that an excellent review of this work could be found in the *Inter-State Medical Journal* for January, 1906, by Dr. John Green, Jr., and in the *Ophthalmic Yearbook*, edited by two of the most active workers, Drs. Jackson and de Schweinitz. He referred to the presence in the Section last year of Prof. Hirschberg and advocated the precedent set of securing some distinguished man in ophthalmology to address the Section. Prof. Carl Wurtzburg Hess had been expected at this meeting, but had found it necessary to cancel his engagement. The chairman referred to the death during the past year of Dr. Swan Burnett, of Washington, in which ophthalmology had suffered a great loss. He announced the adoption of the new plan of having the papers to be read before the Section published in advance, which would be submitted to the Society for its approval. Dr. Taylor said he thought this Section should be the representative Ophthalmological Association of the country; it was the only society from which a reputable oculist could not be debarred by personal prejudice or the delays of membership committees. The utterances of this Society, when unanimous or nearly so, should have greater weight than those of any other ophthalmological society in this country. The last word had not been said on a great many subjects in ophthalmology, as, for instance, on ocular muscles, on cataract operations, on ocular tumors, etc., and there still remained large fields for investigation. The subject of refraction, too, he thought required a greal deal of con-

sideration. More careful instruction in ophthalmology in the medical schools was advocated, and the scientific ventilation of school buildings and their proper lighting with reference to eyesight were also matters that deserved the consideration of the Section. In conclusion, the Chairman said that he hoped at an early date for an expression from the Section as to the prevention of blindness and some definite and uniform instruction and legislation along that line.

A more uniform standard for the illumination of visual test types. Dr. CHARLES H. WILLIAMS, Boston, described a method of obtaining a uniform illumination of the test types by means of two vertical columns of eight five-candle power incandescent lamps placed on each side of the test-type card, one foot in front of the plane of the card and one foot from the nearest edge of the card. The observer was protected from the lights by a screen. The amount of light reflected from the card was measured by a special form of photometer, the effect of varying the illumination in reducing the apparent acuteness of vision being also measured, as well as the amount of reduction of the illumination caused by introducing a fixed amount of resistance into the circuit.

Dr. O. F. Wadsworth, Boston, thought the idea a practical one as there was no question that on very dark days you could not use daylight satisfactorily and artificial light must be employed, but he thought the reflection from the white background somewhat too brilliant.

Dr. Nelson M. Black, Milwaukee, advocated more uniformity in reporting visual acuity as measured by test types, and thought there should be some standard of illumination expressed in candle-power units. He had devised and used a luminous test-type cabinet (*Ophth. Record*, April, 1904), in which the letters are engraved on porcelain and transillumined with three incandescent lamps of eight-candle powers each. Dr. George F. Keiper, Lafayette, Ind., passed around photographs of a test-type cabinet which he had devised. Dr. Miles Standish, Boston, thought Dr. Williams's method radically wrong, in putting a light card in a black box, as it would produce fatigue of the retina. The photometer he considered a very excellent instrument. Dr. H. V. Wuerdemann, Milwaukee, thought there was great necessity for some uniform standard for illumination of test-types,

but thought the method of Dr. Williams would produce retinal fatigue; the background instead of being black should be a dark gray. Dr. Lucien Howe, Buffalo, referred to the Crook radiometer used twenty years ago as a very excellent little photometer, though it was not to be compared with the excellent method of Dr. Williams. He thought the test-types of Dr. Williams very excellent.

A new supplementary test for color vision; the semaphore lamps used in railway service being the source of illumination. Dr. NELSON N. BLACK, Milwaukee, Wisconsin. The writer referred to the dissatisfaction expressed at methods used in testing color vision, which he said had created a demand for a supplementary test which various forms of lanterns had attempted to supply. Such a test, he said, must fit exactly conditions found in practice; persons tested should be required to name the objects; objects for testing should resemble objects in actual use; comparison of colors should be required; test should give impression of signal seen at a distance; it should be such as could be conducted indoors. In the author's supplementary test, the optical laws were brought into operation which reduce the apparent size of an object when looking through the wrong end of an opera- or field-glass. The source of illumination was the standard semaphore lamps actually used in railway block signalling. With the several measurements known, the apparent distance of the object could be deduced from a formula.

Dr. Charles H. Williams, Boston, said a practical difficulty was that the men could give the name to the impressions which they received from the two lights, although they might be extremely defective in color perceptions; there should be a choice between different shades of the same color. Dr. O. P. Frank, Chicago, thought that Dr. Black's formula did not take into account the fact that the light varies as the square of the distance, nor did it take into account the focal length of the lens, the thickness of the glass, and the source and kind of light. The absorption of light, too, he said, varied according to the angle of incidence. Dr. W. R. Parker, Detroit, had had two years' experience with Dr. Williams's lanterns and found them a very valuable aid, having been able to detect color-blindness in those who could pass the worsted test. Dr. Nelson M. Black, in closing the discussion, called attention to the fact, in reply to

Dr. Williams's remarks, that different shades of glass were used in these lanterns. The instruments, he said, were only in the experimental stage, and the working out of the formula might not be at all perfect yet.

A new phenomenon of color conversion. Dr. GEORGE T. STEVENS, New York. This phenomenon which the writer called attention to was as follows: if in the midst of a somewhat extended surface of a given color a narrow strip of complementary color is viewed with a fixed gaze, the narrow strip will be eliminated and its place will be occupied by the predominant color. It was not a color illusion and differed from color phenomena hitherto described. Comparisons were made with simultaneous contrasts, with successive contrasts or after-images, the phenomenon of Purkinje, that of Troxler, and other known principles.

Dr. Charles H. Williams, Boston, considered that the explanation of the phenomenon depended upon two things, chromatic aberration and retinal fatigue. Dr. Nelson M. Black, of Boston, thought that the bleaching effect of various colors of the spectrum upon the visual purple might help to account for the phenomenon. He thought it possible that the long-continued effect of gazing at the green outer color produced so much bleaching of the visual purple at the particular part of the retina the rays fall upon, that the red, after a time, failed to make any impression on that part of the retina. Dr. F. H. Verhoeff, Boston, thought that chromatic aberration did not play any part in the phenomenon, that the diffusion circles would be so small in comparison with the lines of the diagram as not to cause confusion. He did not consider that accommodation played any part either, as could be shown by holding a pencil between the eye and one edge of the red square and looking at it steadily; the phenomenon would take place, and if you removed the pencil, the red would flash out. Dr. Edward Jackson, Denver, suggested that suppression of the image, as when using the ophthalmoscope or microscope with one eye, might have some bearing on the phenomenon. He did not think retinal fatigue played any part in the matter. Dr. Miles Standish, Boston, said that the phenomenon did not always occur with him, and it was evident that it differed with different people. Dr. George T. Stevens, New York, in closing, said he did not

think fatigue of the retina played any part in the phenomenon because many people could make the conversion in a second.

Dendritic keratitis of malarial origin. Dr. E. C. ELLETT, Memphis, Tenn. The writer described an uncommon form of corneal inflammation, appearing almost invariably as a complication of acute malaria. It affects the cornea in a characteristic manner, namely, with an ulcer of peculiar shape (dendritic or branching), which does not tend to suppurate, is never multiple, and rarely, if ever, attacks but one eye, tends to run a protracted course, and, as a rule, without marked uveal irritation. It is probably trophic. In addition to appropriate internal treatment, the local application of tincture of iodine often had a good effect, though frequently a milder means of treatment was best.

Dr. C. J. Kipp, Newark, N. J., said that this form of keratitis he had found almost exclusively among persons suffering from malarial poisoning. In former years, when malarial fevers were very prevalent in his locality, he saw a great many cases of this form of keratitis, but at present, when malarial fevers were less frequent, but few cases came to his notice. Where there was much secretion he had found a solution of silver nitrate, one to two per cent., of benefit. Dionin had also been valuable in the form of an ointment of two to five per cent. He believed that quinine given in large doses had a beneficial effect. He called attention to a class of cases presenting the appearance of choked disks in which the disease was really a circumscribed retino-choroiditis, in which cases the patch of retinal choroiditis is stretched on the border of the papilla, and said the true character of the disease was often not discoverable until the papillitis had subsided, when there was found an atrophic patch fringed with pigment. Dr. H. Molton, Fort Smith, Arkansas, had seen the disease follow chronic malaria. Sometimes there were ulcers in which there were shreds of epithelium about the edges of the dendritic area, and one should not forget that it was possible for these to become infected with pus-forming germs.

Dr. George F. Keiper, Lafayette, Ind., had had a case last year in which there were no symptoms of malaria, and on bacteriological examination a germ had been discovered which could not be differentiated.

Dr. John Green, Jr., St. Louis, called attention to the use of quinine bisulphate in three per cent. solution for local treatment,

used by dipping a cotton-wound probe in the solution and passing it over the surface. Dr. Leartus Connor, Detroit, had not found that local treatment materially hastened recovery, nor that constitutional treatment was very efficacious. In the last two cases he had observed good effects from the use of salicylate of strontium. Dr. Edward Jackson, Denver, took issue with Dr. Ellett's description, that in a sense it could not be said that there was any characteristic change in sensibility of the cornea. The change in sensibility of the cornea, he said, was very easily overlooked, because it might be lost in limited sectors and not over the whole cornea. Dr. S. D. Risley, Philadelphia, had observed that these cases got rapidly better under periodic doses of quinine and arsenic, though he was not prepared to say that they did not act simply as tonics. He referred also to their tendency to recurrence at the recognized periods for recurrence of the fever, and thought there was something specific in this particular form of keratitis.

Uniocular inflammations of the optic nerve and retina. Dr. A. A. HUBBELL, New York. The paper embodied reports of eighteen cases of uniocular inflammation of the optic nerve and retina. Four cases were uniocular optic neuritis, four were uniocular neuro-retinitis, and ten were uniocular retinitis. In some the inflammation was mild, in others, it was severe. The milder cases recovered more or less completely, while vision of the affected eye was lost or nearly lost in the more severe cases. No definite relation to other diseases could be established in most of the cases. Iodide of potassium was commonly given. Some cases seemed to be improved by it, while others were not benefited at all.

Dr. Eugene Smith, Detroit, had long since been convinced that the apparent silence on the part of text-books and journals concerning this matter was only relative. He fully agreed with Dr. Hubbell that these cases were decidedly more common than was generally supposed. He had had recently four cases of uniocular neuro-retinitis under observation. Dr. J. P. Herron, Jackson, Tenn., had, after reading Dr. Hubbell's paper, found in his records four cases which he had had under observation since March first. He was inclined to attribute the frequency of these cases to malarial toxæmia. His four cases were described in detail. Dr. J. A. Patterson, Colorado Springs, said intranasal

complications as a cause of these conditions must not be overlooked, and that patience and skill in examining the nose was required before this possibility could be excluded. Dr. Wendel Reeber, Philadelphia, since reading Dr. Hubbell's paper, had gone over his records and found in the last year three cases of undoubted uniocular optic neuritis. He did not think it a very rare phenomenon. He called attention to the use of chloral in these cases, which acted by producing a cerebral anæmia. Dr. A. R. Baker, Cleveland, had some years ago reported to the Society a case of retinitis circinata in one eye with the other eye normal. He called attention to the danger of examining one eye and taking it for granted that the other was all right. Dr. C. J. Kipp, Newark, N. J., called attention to a class of cases which seemed to be primary optic neuritis and which were not, in which there is a circumscribed retinitis so close to the disk that you cannot separate it, giving an appearance of choked disk until the disease has run its course. The only way to distinguish this condition was to look for deposits on Descemet's membrane.

Dr. E. E. Holt, Portland, Maine, had seen a number of instances of optic neuritis in one eye without appreciable diminution in vision. He thought the condition rather common. Dr. S. D. Risley, Philadelphia, emphasized the danger referred to by Dr. Kipp of mistaking cases of retino-choroiditis for optic neuritis. He was inclined to think uniocular neuritis of less grave import than binocular. He had not been able to determine any general etiology for the occurrence of uniocular neuritis. Dr. W. H. Wilder, Chicago, did not think the condition should be regarded as a disease entity. He thought an explanation might be found in the anatomical asymmetry so frequently seen in the body; there might be asymmetry of the optic nerve. There might be arteriosclerosis affecting the vessels of one eye and not the other. Dr. George E. de Schweinitz, Philadelphia, classified cases of unilateral optic neuritis into four groups: first, unilateral optic neuritis due to brain tumor and other intracranial causes; second, that due to certain well-known infections; third, that due to local causes, the optic foramen or the contiguous sinuses; fourth, that due to conditions associated with the vascular supply, as arteriosclerosis. He agreed with Dr. Wilder's explanation which determined for anatomical reasons a unilateral instead of a bilateral neuritis, and considered it not a disease entity but a local manifestation.

Dr. Melville Black, Denver, called attention to the value of the estimation of blood pressure in these cases and said that where the tension is high its reduction by proper medication would do much towards bringing about recovery. Dr. A. A. Hubbell, Buffalo, in closing the discussion, agreed with most of the suggestions that had been made, particularly those of Dr. Wilder and Dr. de Schweinitz.

Retrobulbar optic neuritis following childbirth. Dr. C. J. Kipp, Newark, N. J. The writer reported two cases. Case I. An attack of retrobulbar neuritis of right eye following four successive childbirths. No albuminuria. During attack following third pregnancy, part of eyelashes and part of hair of brow in line with supraorbital nerve turned white, and the hair growing in this situation has been white ever since. Total blindness of right eye followed fourth pregnancy. The optic neuritis was attributed to a disturbance of vascular supply at or near the apex of the orbit. The absence of pigment in the hair was thought to be caused by a change in the hair-papillæ, whereby the supply of pigment to the hair-shaft was interrupted, this being due to some disturbance in the nerves supplying the papillæ. Similar changes had been observed to follow sympathetic ophthalmia, but none so far after optic neuritis. Case II. One of retrobulbar optic neuritis of one eye after first childbirth. There was eclampsia but no albuminuria. Restoration occurred after many months.

Dr. George S. Derby, Boston, said in discussion, that about a year ago he published a paper on this subject, going over the literature very thoroughly, and he had gotten the impression that no definite etiology could be attached to these cases. Dr. Nelson M. Black, Milwaukee, thought that in the first case the supraorbital neuralgia pointed strongly to the possibility of disease of the sinuses.

Dr. C. J. Kipp, Newark, said, in closing, that the cases referred to by Dr. Derby were attributed to lactation. The cases reported had followed every pregnancy for four successive pregnancies.

WEDNESDAY MORNING, JUNE SIXTH.

Bacteriology of the eyelids. Dr. John S. Derby, Boston. The writer considered the influence of location and of anatomic peculiarities; the influence of the ordinary pus organisms in diseases of the lids, furuncle, erysipelas, abscess, cellulitis,

hordeolum, and blepharitis; the diseases caused by the various specific bacteria, tuberculosis, leprosy, and the like; and the diseases due to animal parasites, as pediculosis, cysticercus of the lids; and diseases due to vegetable parasites, such as ringworm and favus, giving a complete résumé of the literature on the subject.

The pathogenic bacteria of the conjunctiva. Dr. EDWARD A. SHUMWAY, Philadelphia. The writer considered the established facts concerning the bacteriology of conjunctivitis, and said the same form of conjunctivitis may be caused by different organisms, and that one organism may cause different forms of conjunctivitis. The general morphology was now generally settled. The special organisms, such as the Koch-Weeks bacillus, diplobacillus, pneumococcus, gonococcus, diphtheria bacillus, xerosis, staphylococci, streptococci, and the rare organisms were all considered.

The pathogenic and pyogenic bacteria of the eyeball. Dr. JOHN E. WEEKS, New York. This paper considered the various micro-organisms that affect the cornea, the sclerotic, the iris, lens, vitreous humor, ciliary body, retina, choroid, and optic nerve, and the lesions that they produce. The peculiarity of direct and secondary, of primary and metastatic, invasions of the various parts of the eyeball by various organisms was discussed.

In discussion, Dr. Robert L. Randolph, of Baltimore, called attention to the bacillus coli communis as sometimes producing inflammation of the eye, and said it had been demonstrated in the interior of the eye in panophthalmitis. Dr. E. V. L. Brown, of Chicago, considered that Dr. Derby had thoroughly covered the subject of his paper, and that in the future it would be a place to which to refer for the literature of the subject. Dr. Wm. C. Posey referred to the various types of conjunctivitis caused by the diplobacillus of Morax-Axenfeld, and said the inflammation was not as active as that occasioned by the pneumococcus. Iritis with synechia and hypopyon were not uncommon. The most common type of ulceration of the cornea excited by the diplobacillus occurred in the form of a disk-like infiltration of the superficial layers of the central portion of the cornea. The inflammation excited by the diplobacillus, the speaker said, yielded readily to applications of zinc. Dr. George S. Derby, Boston, said that in seventy-eight cases of conjunctivitis examined

at the Eye and Ear Infirmary the diplobacillus had been found seven times in pure culture. Dr. Edward Jackson, Denver, referred to an epidemic in the spring of 1904 originating in Denver, and said in reference to corneal involvement that he had seen only one severe case due to the diplobacillus and that it yielded readily to the zinc treatment. Dr. C. D. Wescott, thought that many American patients resisted the zinc therapy, and that some would tolerate zinc ointment who would not tolerate the solution. Dr. C. W. Hawley, of Chicago, in an epidemic had used antipyrine successfully. Dr. Wm. M. Sweet, Philadelphia, had made spreads and cultures in thirty-one cases of conjunctival and corneal disease and found the diplococcus present in six cases. The zinc sulphate, one grain to the ounce, was the only treatment to which they responded. Dr. Chas. H. Williams, Boston, had found the soda idolate of zinc beneficial in these cases, especially when combined with chlorotone. Dr. Nelson M. Black, of Milwaukee, had noticed that in these cases the patients almost invariably complained of symptoms closely related to those of refractive errors showing the importance of bacteriological examination in many refractive cases. Dr. E. V. L. Brown, Chicago, spoke of a case of bacillus subtilis infection following a penetrating wound of the sclera in which a pure culture of the bacillus subtilis was obtained. Dr. Brown Pusey, Chicago, thought that the failures with the zinc treatment were due to the fact that the treatment was not persisted in long enough. Dr. Edward A. Shumway, Philadelphia, said that Axenfeld in his last article concludes that the diplobacillus has a capsule which is demonstrable by special staining methods.

The staining and examination of the bacteria of the eye by simple, practical methods. Dr. EDGAR S. THOMPSON, New York. The paper describes simple and practical methods of preparing film preparations, methods of staining, counter staining, and decolorization. The examination of the gonococcus in fresh smears, the diplococcus of meningitis, the Koch-Weeks bacillus, the Morax-Axenfeld diplobacillus, the Klebs-Loeffler bacillus, the pneumococcus, xerosis bacillus, the methods of preparing scrapings from the conjunctiva and cornea, and of making tissue sections were discussed.

Dr. Brown Pusey, Chicago, presented microscopes and slides for demonstrating about twenty-five forms of bacteria which

invade the eye, and in discussing the paper suggested that the title be changed to read "The Staining and Examination of the Bacteria of the Eye by Accurate Methods," as he thought accuracy in the examinations more important than ease and rapidity. Dr. Arnold Knapp, New York, thought the bacillus of influenza would be found more frequently in these cases if proper culture media were used. He referred to the necessity of making cultures as well as smears in the examination for the diphtheria bacillus. Dr. George S. Dixon, New York, agreed with Dr. Knapp that a diagnosis should never be made of diphtheria without a cultivation. Dr. John E. Weeks, New York, emphasized the necessity for the staining of secretions and the examination of smears in cases of conjunctival disease as clinical examination alone was not sufficient in a great many cases. Dr. E. L. Meierhof, New York, thought that unless one was constantly cultivating this work his bacteriological examinations would be very unsatisfactory. Dr. Brown Pusey, Chicago, protested against turning the examinations over to some one else, and thought it behooved the man treating the case to find out for himself the cause and nature of the disease.

Physical economics. Dr. E. E. Holt, Portland, Me. This paper dealt with a mathematical formula for the normal earning ability of the body, by which, with the requisite data, a person may be either rated or his economic value may be ascertained, and thereby damages to his body from injury or disease, with an indemnity to be allowed therefor, may be determined in a manner equitable to all concerned. When called on to ascertain damages to the eyes from an injury, an oculist frequently met with other disabilities which occurred at the same time. If he worked in connection with other physicians and surgeons who were to determine damages to other parts of the body, it was highly important that there should be standard methods of procedure which could be applied to every system and organ of the body so that each might understand the other and work together to obtain results on a scientific basis. Methods by which this might be accomplished were demonstrated.

Dr. H. V. Wuerdemann, Milwaukee, said that there was a remarkable similarity of results obtained by these methods to the damages given in several hundred damage suits that he had collected. He thought that we needed statistics on the subject,

and that each one should contribute to the literature one or more cases showing the amount of earning capacity after a certain accident, as it was only by such evidence that we would be able ultimately to exactly determine the percentage of loss of earning ability following a given accident. Dr. L. W. Fox, Philadelphia, said it was very desirable to have some such system by which we could form an opinion to place before the courts when called upon. Dr. Edward Jackson, Denver, thought that functional ability was the foundation of the whole subject and would have to be settled by our united statistics, and the members should consider the cases that come to their notice with reference to this point so that we could have a basis for making these formulæ of greater value.

Some unusual ocular manifestations of arteriosclerosis. Dr. WM. ZENTMAYER, Philadelphia. The paper reported a case of optic atrophy, one of periodic transient total blindness of both eyes followed by prolonged obscuration of the inferior field of vision, developing into permanent total blindness of this area, with atrophy of the upper half of the papilla, shrinking of the corresponding vessels, and evidence of sclerosis of all the retinal vessels of one eye. Secondly, a case of monocular visible spasm of the central artery of the retina. There was repeated opportunity of studying the fundus during an attack, and the author gives a description of the phenomena witnessed.

WEDNESDAY AFTERNOON, JUNE SIXTH.

A demonstration of the fundi of some birds, with remarks on their eyes and eyesight. Dr. CASEY A. WOOD, Chicago. This consisted of an exhibition with the opaque projector and stereopticon of a series of drawings, showing the anatomic and physiologic characteristics of the fundi of some birds.

Relations of the superior and inferior recti muscles to convergent squint. Dr. EDWARD JACKSON, Denver. The writer said, as the eye is turned inward the power of the primary adductor, the internus, diminishes. But the superior and inferior recti, attached in front of the centre of location of the eyeball, have their insertions carried inward, so that they gain more and more power to turn the eye in or hold it in convergence. This makes these muscles, or rather nasal portions, of

great importance in convergent strabismus. A case reported illustrated the permanence of results obtained by extended tenotomy. The primary adductor and abductor, the internus and externus, tend to equilibrium with the eye directed forward. The secondary adductors, the superior and inferior recti, and the secondary abductors, the obliques, tend to turn the eye ever more strongly in or out. A rational operation to correct excessive convergence must tend to lessen the relative influence of the secondary adductors.

Dr. Francis Valk, New York, did not believe that nature ever placed a muscle in the human economy to perform two or three different functions; they had but one function, and if cases of squint were studied on that principle, operations would be more successful. Dr. G. C. Savage, Nashville, thought we should not forget that there were two purposes in view in operations on the muscles: one to increase or lessen the tonicity of the muscle; and the other to change the plane of its action. The tonicity of a muscle should always be taken into consideration before operating upon it. He thought Dr. Jackson had placed a dangerous precedent before us. Dr. M. D. Stevenson, Akron, Ohio, thought there was no muscle attached to the eye that had not three different movements, which he demonstrated by drawings on the board. Dr. Frank Todd, Minneapolis, thought there might be certain cases in which this might be valuable—where measurements showed an excess of rotation inward and no defective rotation outward. Dr. John A. Weeks, New York, protested against the operative procedure as not only weakening the internus and the secondary adductors, but also the externus. He thought it dangerous to advocate an operation so pregnant of evil. Dr. Miles Standish, Boston, considered the method a very good one and had done some operations with entire success in analogous conditions.

A study of convergence and its defects, including an analysis of four hundred and forty-one cases of exophoria. Dr. WENDELL REBER, Philadelphia. The paper considered the evolution of binocular vision; evolution of convergence as a separate act; ontogeny and phylogeny of convergence; analysis of the act of convergence. It gave an analysis and statistic arrangement of 433 cases of exophoria. It considered exophoria not a passive condition, but a reversion to the next lower type

(that is to say, an atavistic phenomenon). The author draws twenty-three conclusions relative to the symptomatology and treatment of exophoria.

Dr. Edward Jackson, Denver, agreed with the author's conclusions as to treatment in the order in which they were given; right living, careful refraction, convergent training, prisms (bases in) for infinity, prisms (bases in) for reading-glasses only, tenotomy or advancement. With reference to exophoria and age he also agreed with Dr. Reber that it becomes more common with increasing age. He thought low degrees of exophoria extremely common. Dr. Alexander Duane, New York, preferred the cover test (measuring the deviation with prisms) in testing exophoria for near. He was opposed to the use of prisms for constant wear, because while serviceable for a time they seemed in the long run to be detrimental. Dr. G. C. Savage, Nashville, said that no test of the lateral muscles was reliable when made under the influence of the mydriatic, as the relationship between convergence and accommodation was such that if you take away the accommodative power you destroy the converging power and do not get reliable results. Dr. Oscar Wilkinson, Washington, considered that there was a certain class of cases where one never got more gratifying results than with the use of prisms. He did not believe that exophoria increased under the use of prisms.

Some axioms concerning ocular rotations. Dr. G. C. Savage, Nashville. The papers submitted the following axioms: 1, a loose, well-fitted convex sphere in a fixed concave sphere may be rotated on any diameter; 2, the axis of rotation must be at right angles to the plane of rotation; 3, the centre of curvature is the centre of rotation; 4, no single diameter must lie in every rotation plane; 5, the eye has a single diameter (the visual axis), which is common to all planes of rotation; 6, centre of macula is posterior pole of eye; 7, centre of rotation is centre of retinal curvature; 8, all axes of rotation lie in the equatorial plane at right angles to all meridional planes; 9, plane of horopter must contain the two visual axes, the two centres of rotation, and the two horizontal retinal meridians; 10, axis of horopteric plane connects the two rotation centres; 11, eyes not level must be torted in direction of lower eye; 12, every line of direction is a radius of retinal curvature prolonged.

This paper was discussed by Dr. George H. Price, Nashville, Dr. M. D. Stevenson, Akron, Ohio, Dr. F. H. Verhoeff, Boston, and Dr. Lucien Howe, Buffalo.

Ophthalmic practice of the present time. Dr. FRANCIS VALK, New York. The author considered that the study of refraction and motility of the eyes should not be according to any special method or follow any special teachings; that all objective methods of examination were essential in refraction and motility; that heterophoria was a well-established abnormal condition of the motility of the eyes and should be corrected either by glasses or operation; that cases of refraction not relieved by glasses might not be failures if examined as to motility.

Dr. A. E. Prince, Springfield, Ill., had found so many cases of asthenopia accompanied by small errors of refraction and little or no muscular imbalance that he designated them "atonic asthenopia," and found that they were nearly always caused by unwise use of the eyes. For these cases he advised work at normal range with an interruption every five minutes by ten seconds' rest. He favored advancement as an operation in heterophoria or strabismus. Dr. Oscar Wilkinson, Washington, believed that the use of homatropin would often fail to bring out what he termed astigmatic accommodation, and atropin should be used. Dr. G. M. Gould, Philadelphia, advocated an endowed and recognized optical refraction school as none of the profession seemed to agree with one another in their prescriptions for glasses. Dr. Leartus Connor, Detroit, disagreed with Dr. Gould and said that he met every day with work of his fellow ophthalmologists with which he absolutely agreed, and he did not think there was any need for a school to teach refraction.

Conjugate lateral deviations. Dr. J. H. CLAIBORNE, New York. The paper referred to the associate or conjugate movements of the eyeballs, reviewed the literature bearing on associate deviation as a symptom of apoplexy. It considered the conjugate lateral deviation caused by primary nuclear disease; vertical form of conjugate deviation; the cross fibres passing from nucleus of sixth nerve to nucleus of third nerve on opposite side; the existence of these fibres necessitated by symptoms and signs in nuclear paralysis. It referred to the demonstration of their existence by Graux, and reported two cases observed by the author, one probably from cortical irritation, the other probably

from a nuclear lesion. The author presented a rearranged scheme to indicate the position of lesion by the direction of the eyes.

Dr. M. D. Stevenson, Akron, Ohio, said that muscular spasms due to irritation, and paralysis due to destruction, furnished the same local diagnosis; that paralysis might be due to a peripheral nuclear or central lesion; that conjugate paralysis must be nuclear or central. In nuclear paralysis there was suspension of voluntary and involuntary movements, and nerve and muscle degenerate at an earlier or a later period. Convergence was supposed to be controlled by a central collection of nerve nuclei common to both sides, whereas the internal rectus in conjugate movements of both eyes was controlled by a collection of nuclei connected with the nucleus of the opposite sixth nerve. Dr. Alexander Duane, New York, agreed with Bernheimer that there is no anatomical foundation for Graux's view, and thought the clinical facts better explained by the actual anatomical conditions.

Incurable eyestrain. Dr. GEORGE M. GOULD, Philadelphia. The author said that it was sometimes impossible to relieve eye-strain, because impossible to reach causes. This should be understood, so that (1) the occupation and use of the eyes may be regulated to lessen symptoms; (2) that other physicians may not err in treatment which cannot reach the causes. Causes of incurable eye-strain: (1) certain congenital anomalies, such as albinism, colobomata, and malformations which render the eyes optically imperfect; (2) some high degrees of ametropia; (3) the sequels of inflammatory disease, traumatisms, etc; (4) amblyopia or other incurable injuries resulting from uncorrected ametropia, loss of accommodation, subnormal accommodation, etc.; (5) heterophoria or heterotropia of too long standing to be relieved by the ordinary methods; (6) interruptions or contradictions of the normal co-ordinations of dextrocularity and dextromanuality; (7) incurable cerebral or nervous diseases such as paralysis, paresis, myosis, nystagmus, tremor; (8) diseases, rarely, of the general system or adjacent organs; (9) unhygienic use, over-use, or abuse of the eyes which we cannot stop.

Dr. Peter A. Callan, New York, deprecated that Dr. Gould totally ignored or slurred over the operative side of ophthalmology. He did not agree with the writer that lack of proper

fitting glasses was productive of cataracts. Dr. George M. Gould (closing the discussion) said that Dr. Risley had long contended that cataracts were due to choroidal disease, and he believed that choroidal disease might be due to eye-strain. He had never seen a case that had worn proper glasses that had developed cataract [!!—EDITOR].

THURSDAY, JUNE SEVENTH, MORNING SESSION.

Some personal experiences in the use of electricity in ophthalmic practice. Dr. W. FRANKLIN COLEMAN, Chicago. The paper treated chiefly of chronic cases, usually intractable, with inflammatory exudates and functional or organic disease of nerve tissue. Phenomenal recoveries, other therapeutic means having failed, demonstrated that electricity can favorably modify tissue changes which medication is powerless to effect. Superior electrolytic effect of galvanism indicated its use where exudates formed the chief pathologic factor. The writer said that no disease seemed to yield more certainly and completely to this treatment than vitreous opacity. The sinusoidal current is used in primary optic atrophy; there was improvement in 66 per cent. of cases. In muscular paralysis the interrupted galvanic current was used as it produced more profound contraction than the faradic, while it furnishes the electrolytic and nerve stimulating effects which the latter lacks. Contrary to the view of most oculists, the author believed that his experience aids in demonstrating that electricity has justified its claim to usefulness in ophthalmic practice.

Dr. S. L. Ziegler, Philadelphia, thought it unfortunate that electricity, which was accomplishing so much in neural therapeutics, should be looked upon with skepticism by the ophthalmologist. He thought that the evidence should convince every careful and unbiassed observer that electricity should be accorded a most honored position in ocular therapeutics. Dr. Leartus Connor, Detroit, thought that as a general thing the use of electricity had been disappointing, and that it took up too much of the time of both patient and physician. Dr. Lucien Howe, Buffalo, asked if there were any statistics where the same condition existed in both eyes and the treatment was applied to one and not the other. Dr. H. V. Wuerdemann, Milwaukee, said the high-tension galvanic current was of great value in securing absorption of exudates within the eyeball in cases of choroiditis

and uveitis, and for stimulation of nutrition in cases of partial optic-nerve atrophy. Dr. E. J. Brown, Chicago, reported a case of amblyopia improved after three weeks' treatment. Dr. George F. Keiper, Lafayette, suggested the human finger as the best electrode, allowing the current to pass through the body by the finger into the patient's eye. Dr. W. F. Coleman, Chicago, in closing the discussion, said that his cases had been chronic cases, while Dr. Ziegler had referred to acute cases. He gave a word of warning as to the use of the graphite rheostat, that made of a combination metal being much better.

The X-ray in ocular therapeutics. Dr. G. ORAM RING, Philadelphia. The essayist considered the question of the application of Roentgen therapy in superficial epithelioma involving the eye and ocular adnexa, rodent ulcer, carcinoma, orbital sarcoma, trachoma, vernal conjunctivitis, and a few other forms of ocular disease. He reviewed the literature on the subject and the previously unpublished opinions of well-known ophthalmologists, and concluded that it made a great advance in the treatment of superficial epithelioma and rodent ulcer, and would usually effect a cure; if unsuccessful, then electro-chemical sterilization could be used, and finally excision; X-ray treatment had proven of value in the more extensive orbital carcinoma, but it was conceded that the deeper the growth the less favorable the result; it exerted an anodyne influence on malignant disease of the eyelids and orbit; progress in the treatment of trachoma had been effected by the X-ray therapy; evidence indicated its value in vernal conjunctivitis.

Dr. George S. Dixon, New York, considered the paper a very valuable contribution to the subject. He had been forced to the conclusion that the earlier ideas must be toned down considerably. His experience with epithelioma of the lids had not been satisfactory, and he cited a number of cases. Dr. W. F. Coleman, Chicago, had had good results in trachoma. Dr. Charles S. Bull, New York, thought it the most valuable remedy we had in the treatment of superficial carcinomata; the deeper the disease became, the less value, in his opinion, was this treatment. Dr. John E. Weeks, New York, referred to the tolerance of the retina to the X-ray; it was not affected apparently. Dr. Edward Jackson, Denver, had had a case of recurrent epithelioma of the lid, recurring within a few months after excision, treated with

the X-rays that had now been free from evidence of disease for five years. As to trachoma, he thought the bad cases that had shown resistance to other methods had not been benefited by the X-ray. Dr. A. R. Baker, Cleveland, had had a number of cases of epithelioma in which the X-ray had brought about recovery. He had had several cases of sarcomatous tumors involving the sinuses in which there was no benefit except the relief of pain. Dr. John Green, Jr., St. Louis, had had recently under observation a woman of sixty-five, operated upon thirteen years ago for mammary cancer; about two years ago the disease recurred at the inner angle of the right eye; under X-ray treatment the tumor had subsided. Dr. K. C. A. Wood, Chicago, referred to a case of secondary glio-sarcoma. He advocated the use of the X-ray treatment as a relief for pain. Dr. C. D. Wescott, Chicago, cited a case of sarcoma of the orbit in which the ray was used three months with recovery. Dr. W. B. Marple, New York, in a case of recurring sarcoma in which an exenteration of the orbit was done, and the X-ray applied to the orbital tissues, had found no effect as to the recurrence of the sarcoma. Dr. Wm. Sweet, Philadelphia, referred to the necessity for drainage for the tissue destroyed by the X-ray, as otherwise patients might develop septicæmia. He thought the use of the X-ray in the treatment of trachoma a waste of time. Dr. L. W. Fox, Philadelphia, had had good results in the epitheliomata; no results in the treatments of trachoma. Dr. C. L. Leonard, Philadelphia, said that in the deeper growths we were not able to secure results; we could hardly expect to reach the deep-seated growths that had already produced metastases. Dr. D. L. Edsal, Philadelphia, referred to the general effect upon metabolism and possibilities for harm of the X-ray; he considered the X-ray one of the most violent therapeutic measures we have, and thought it should be used with great care.

Ocular injuries from foreign bodies, with a report of four hundred and twenty cases. Dr. Wm. M. Sweet, Philadelphia. The writer considered the importance of early diagnosis by the Roentgen rays in every eye with lowered vision following injury by a foreign body: the results of magnet extraction of iron or steel from the vitreous through an incision in the sclera; the rarity of retinal detachment as a direct result of operation; magnet extraction complicated by fibrinous exudation surrounding

the metal in old injuries; traumatic irido-cyclitis following frequent insertions of the magnet point into the vitreous; the percentage of eyeballs lost from panophthalmitis was small; large number of traumatisms with lodgment of the body in the eye; the successful cases of extraction that have retained useful vision for many years.

Dr. Howard F. Hansel, Philadelphia, advocated the procedure of localization before use of the magnet, and subsequent extraction through the cornea of bodies situated in the lens or anterior to it and through an opening in the sclera for those posterior to the lens, but he did not believe localization indispensable to the successful management in many cases. In cases of recent injury he thought it safer to allow non-magnetizable particles to remain in the eye, unless easily accessible, rather than probe the vitreous with forceps or other instruments. Dr. J. Ranly, Cincinnati, had devised a method of attaching a flexible extension arm to the magnet which could be moved in any direction. Dr. W. F. Coleman, Chicago, had devised an arrangement with a ball-and-socket joint which permitted of movement in any direction. He did not advocate Haab's method of removing the foreign body through the anterior chamber. Dr. Frank Todd, Minneapolis, had practised Haab's method and been surprised at the ease with which it could be used; he thought it had certain advantages over removal through the sclera where the body could not be observed. Dr. S. D. Risley, Philadelphia, said we should differentiate between injuries resulting from the foreign body itself and those caused by efforts for its extraction. He deprecated the idea of removing the foreign body by making a new path through the vitreous, thereby increasing the possibility of infection; it should be extracted by the shortest possible path, as indicated by localization. Dr. Wm. H. Wilder, Chicago, deprecated the practice of using the magnet at once to make a diagnosis of foreign body in the eye; he thought a radiograph should be made first, and probably with a localizing apparatus.

Dr. Edward Jackson, Denver, referred to a case in which a splinter of steel had caused a wound in the cornea, anterior capsule, and posterior capsule; extracted with the Johnson magnet through the sclera, followed by clearing up of the lens.

Auto-intoxication in relation to the eye. Dr. George E. de Schweinitz, Philadelphia. This paper reviewed the modern ideas

on the subject and considered the toxines produced by intestinal decomposition; the relationship to certain diseases of the cornea, sclera, and uvea; the possible relationship to amblyopia and retrobulbar neuritis, acute and chronic. He said toxines may be accessory causes and the means by which the symptoms are continued, even when the well-known exciting cause has ceased to be operative. He went over the researches of Dr. Edsal and his own in regard to the relationship of enterogenous decomposition-products to the development and continuance of so-called toxic amblyopia when this is produced by tobacco and alcohol. The probable relationship of auto-intoxication to certain post-operative phenomena, notably post-operative delirium, iridocyclitis, and glaucoma. Many illustrative cases were quoted. The writer said that great reserve was needed in attributing these cases to auto-intoxication, but it should not be forgotten in their clinical study. Accurate chemical analysis of the urine secretions under all the conditions named was necessary.

Dr. Casey A. Woods, Chicago, thought that Dr. de Schweinitz's work offered an explanation for a great many obscure conditions in the eye. He referred to the possibility of carrying these experiments further with monkeys instead of dogs. Dr. Chas. S. Bull, New York, thought that too little attention had been given to the connection existing between certain obscure diseases of the eye and intestinal auto-intoxication. He had seen a number of cases within the last few years in which the gastro-intestinal factor had been the sole contributing cause.

Dr. W. B. Marple, New York, agreed with Dr. Bull as to the connection between these obscure diseases of the eye and auto-intoxication, and referred to several illustrative cases. Dr. Wm. C. Posey, Philadelphia, referred to two cases in which auto-infection was the causal factor and in which the patients improved on proper diet and eliminant treatment. Dr. John E. Weeks, New York, referred to two cases, one of neuritis and one of retinitis due to auto-intoxication, which cleared up under the use of intestinal antiseptics. Dr. S. D. Risley, Philadelphia, said that the comforts of the patient and the removal of trouble in some of these cases by attention to the gastro-intestinal tract were amazing. Dr. Edward Jackson, Denver, mentioned a case of amblyopia and commencing optic-nerve atrophy that cleared up after attention to the gastro-intestinal tract. He had also had three cases of chronic relapsing iritis that responded only to this

treatment. Dr. John Green, Jr., St. Louis, reported a case of glaucoma simplex that recovered only after attention had been paid to the gastro-intestinal intoxication.

The eye injuries of Independence Day. Dr. ROBERT L. RANDOLPH, Baltimore. At the Atlantic City session he had called attention to the frequency of eye injuries on Independence Day. Ophthalmologists probably see more such cases than other physicians, for wounds of other parts of the body are treated by physicians, while eye injuries are treated by a limited few in the larger cities and towns. Their observations had suggested the taking up of the subject by ophthalmologists with the view of making it punishable by a fine either to sell or to set off fireworks in the city. Great improvement in the condition of affairs had been brought about in Baltimore with the help of the newspapers and co-operation of the police department.

Dr. G. C. Savage, Nashville, discussing this paper, thought that any laws regarding this subject should apply to all holidays as well as to Independence Day, and said that in his part of the country there had been more injuries of this kind on Christmas Day than on the Fourth of July. At the present time, however, no fireworks were allowed on the street on any holiday.

Injuries of the eye with bird shot. Dr. W. B. MARPLE, New York. The paper reported two cases of double perforation of the eyeball from bird shot. The necessity of depending on the skiagraph in estimating the prognosis was insisted upon. The prognosis depended not only on the location of the injury, but on whether one or more shot are lodged within the eyeball, or have passed through the eyeball and from their location in the orbit produced pressure symptoms and impairment of function. The writer said that shot coming from a gun are usually sterile and the lead in itself is not apt to set up irritation. He thought that the wound in the eyeball should not be probed, and an effort should be made to keep out infection.

Dr. Geo. E. de Schweinitz, Philadelphia, agreed with Dr. Marple as to the importance of X-ray examination in these cases, particularly for the purpose of ascertaining whether or not the shot had remained within the globe or passed through into the orbital tissue. If infected irido-cyclitis was present, he thought enucleation in most instances would be required. Dr. H. V. Wuerdemann, Milwaukee. said that lead shot were not only aseptic but antiseptic, which accounted for the few infected

wounds of shotgun injuries. He was of the opinion, however, that all eyes containing bird shot, and having little or no vision, should be enucleated for the reason that they later undergo changes that demand enucleation. Dr. Edward Jackson, Denver, referred to the difficulty of extracting bird shot from the eyeball, the shape of the shot preventing it from becoming fixed, so that it moves away from the instrument. Dr. Robert L. Randolph, Baltimore, thought that experiments had shown that bird shot are not always aseptic. Dr. S. D. Risley, Philadelphia, could not recall a single instance in which infection had followed injury to the eye from bird shot, but chemical changes take place which had proved serious and required removal of the eyeball. Dr. Chas. H. Beard, Chicago, advocated the removal of the shot when within the anterior chamber. Dr. Wm. Sweet, Philadelphia, called attention to the necessity for considering the diameter of the eyeball, as to whether 24 or 26*mm*, in localizing these foreign bodies.

THURSDAY, JUNE SEVENTH, AFTERNOON SESSION.

Exhibition, by means of the new opaque projector, of original colored ophthalmoscopic drawings. Dr. CHAS. H. BEARD, Chicago. This series of pictures referred mainly to the so-called physiologic or congenital fundus anomalies. First was shown the normal fundus, and certain peculiarities in connection with it were described. Then followed anomalies of the optic nerve, of the retina, and of the choroid in succession, or of two or more of these combined. As occasion offered, the pathologic appearances were shown that are apt to be mistaken for the physiologic, and the distinguishing features were pointed out.

The ripening for immature senile cataract: its place. Dr. FRANK C. TODD, Minneapolis. The author discussed the conditions under which the ripening operation is justifiable, as compared with the extraction of immature senile cataracts. The opinions of many ophthalmologists in the United States were quoted and answers to circular letters were given. The writer concluded that if we grant the success and safety claimed by those of much experience in irrigation, the operation of ripening is indicated: (1) in case of immature cataract (not mentioned as contra-indicated), in which a preliminary iridectomy is to be performed; (2) in those patients who would not be likely to behave well during the extraction, thus preventing the operator

from performing much toilet or from practising irrigation. If irrigation is not practised, trituration of the lens would be indicated in all patients with immature senile cataract under sixty, in whom, for reasons mentioned, relief is required.

Some important considerations in the extraction of cataract. Dr. MARK D. STEVENSON, Akron, Ohio. The writer considered the necessity of thorough examination and preparation of the patient and gave description of screens for the patient's and operator's breath and saliva. He advocated the large, completely bordering conjunctival flap which is easily folded on the cornea, described the method of obtaining it, the position and size of the sclero-corneal incision, where to grasp the iris when withdrawing it, and described the advantages of sphincterotomy over the simple operation, sphincterectomy, iridectomy, or peripheral buttonhole in iris.

Cataract extraction with modified iridotomy. Dr. F. H. VERHOEFF, Boston. The operation advocated by the writer consisted essentially in making a buttonhole at the root of the iris and incising the iris from this opening to the pupil by means of iris scissors. The lens is then extracted in the usual way or in its capsule. The operation offers the advantages of both the simple and combined operations without their disadvantages, according to the opinion of the writer. The lens, he said, is removed with the same ease as in the combined operation and cortical matter is readily expressed. The excision of iris tissue is made where it will be most effective in preventing iris prolapse and at the same time do the least damage from an optical standpoint.

The use of the secondary cataract knife. Dr. MELVILLE BLACK, Denver. The writer described a probe-pointed secondary cataract knife which he presented. It is fashioned after a Graefe knife, except that it has a probe point. Mackenzie, he said, used a probe-pointed secondary knife more than fifty years ago, but of late years it had fallen into disuse. The knife was used by the author for enlarging the angles of the wound when found to be too small, or for making dissection when the anterior chamber is evacuated before a counter puncture is made, and for completing dissection when the iris has fallen in front of the knife before the section is finished.

In discussion, Dr. M. Wiener, St. Louis, advocated Major

Smith's method of removing the lens in capsule. Dr. A. E. Bulson, Jr., Fort Wayne, in discussing Dr. Stevenson's paper, said that the pre-operative attention and precautions recommended by the essayist were excellent from a theoretical standpoint, but in practice were apt to increase unnecessarily the anxiety of the patient, and he questioned if so much attention was indicated. He advocated the wearing of a strip of folded gauze over the mouth and nose to prevent possible infection from the breath, and the covering of the head with a sterile cap to prevent infection from the hair. He advocated the use of artificial condensed light. For the average operator he thought the combined operation the easiest to perform, and that, all things considered, it gave the best results. Dr. Allen Greenwood, Boston, in discussing Dr. Verhoeff's paper, said the operation advocated was an extension of the buttonhole operation devised by Chandler for preventing iris prolapse. He did not agree with the essayist that the operation combined all the advantages of both the simple and combined operations without their disadvantages, and thought that a small iridectomy was just as effective. Dr. Casey A. Wood, Chicago, in discussing Dr. Black's paper, advocated the use of the knife in cases where the iris fell over the blade, rather than attempting to turn the blade of the Graefe knife. Dr. L. Webster Fox, Philadelphia, thought the knife devised by Dr. Black would be very useful in many cases. Dr. Oscar Wilkinson, Washington, referred to the use of a blunt-pointed knife in cataract operations, described by Dr. F. Bischoff, London, in 1793, in his little book entitled, *A Treatise on the Extraction of Cataract.* Dr. Wendell Reber, Philadelphia, advocated the combined operation for cataract extraction, and deprecated the use of Major Smith's operation. Dr. S. L. Ziegler, Philadelphia, advocated the use of the keyhole iridectomy as being the best. Dr. A. R. Baker, Cleveland, thought that most of the older operators had abandoned the ripening operation. Dr. C. W. Hawley, Chicago, had done a number of ripening operations with success. He would not attempt to extract in the capsule. Dr. W. B. Marple, New York, in speaking of Dr. Black's knife, said that some cataract knife might be inserted upside down, but there was little difficulty in turning it. Dr. E. E. Jack, Boston, had done nine or ten extractions in capsule none of which had been failures. Dr. E. E. Holt, Portland, thought the older operators had abandoned the ripening of immature cataracts, although

every one might do it in certain cases. In the preparation of the patient he advocated the use of bromide of potassium or morphia the night before.

The value of myotics in the treatment of chronic simple glaucoma. Dr. Wm. Campbell Posey, Philadelphia. This paper was a plea for the continuous and intelligent use of myotics in the treatment of chronic glaucoma, and referred to their great value in this class of cases notwithstanding the generally accepted view of their comparative uselessness. The writer spoke of the desirability of their continuance in the early stages, even when the diagnosis of glaucoma had been confirmed. He reported a case showing remarkable preservation of vision in an eye the seat of advanced glaucoma, by continuous use of myotics over a period of twelve years. The power of eserin and pilocarpin in chronic glaucoma to preserve the unoperated eye from glaucomatous attacks after iridectomy on its fellow was discussed, and the necessity for maintaining the pupils in a state of almost maximum contraction. He considered the proper dosage and the best manner of administering both eserin and pilocarpin and the choice between them in various types of cases.

Dr. John A. Weeks, New York, thought that better results might be obtained with myotics if their use was persisted in as advised by Dr. Posey, but not the least of the difficulties was the lack of perseverance on the part of the patient. If for any reason the treatment could not be satisfactorily carried out, or if, on subsequent examinations, there was a diminution of the field for form or color, he would urge iridectomy. Dr. Chas. S. Bull, New York, was in full accord with the statement of Dr. Posey that operative procedures were always to be deprecated when other means are equally valuable. He thought iridectomy almost valueless in chronic simple glaucoma unless done early in the progress of the disease. For some years, in the more advanced cases he had followed the line of treatment indicated by Dr. Posey and had been at least satisfied with the results. Dr. Geo. E. de Schweinitz, Philadelphia, thought Dr. Posey would find many if not the majority of surgeons in accord with him in so far as his estimate of the value of myotics was concerned in the treatment of this disease, and also find many surgeons totally averse to iridectomy in the treatment of so-called chronic glaucoma. Personally, he was perfectly satisfied of the great value

of myotics in the treatment of this disease, no matter at what age, and believed they should be continued persistently as long as they did good, but that it was safe to use them only with the patient under control and with frequent tests of the light sense, the field of vision, the color sense, and particularly for the presence of scotomas. Dr. W. H. Wilder, Chicago, did not believe that chronic glaucoma cases were ever benefited by iridectomy, but that many of them were injured by the operation. The keynote of the whole matter was that we should study the changes going on in the vessels and the increased arterial tension; that constitutional treatment was more important than iridectomy. Dr. Peter Callan, New York, did not think that iridectomy did any harm if properly done, and he advocated its use.

FRIDAY, JUNE EIGHTH, MORNING SESSION.

So-called leucosarcoma of the iris. Dr. E. V. L. Brown, Chicago. The writer considered that Ribbert's theory of the origin of all uveal sarcomas from chromatophores is worthy of most careful further consideration. Second, that the analogy between the round, spindle, and star-formed cells which proliferate in sarcoma, or the spindle and star-formed cells found in the embryonic choroid, is incomplete, because a round-cell first stage has not been proved to exist in the latter. Third, that it is more reasonable to suppose that the "cell reversion" takes place to any one of these forms of sarcoma, analogous to the relations which obtain between embryonal and pathologic conditions in glioma, than it is to suppose that lower cell forms are transformed into higher cell forms. Fourth, that so-called leucosarcoma of the iris offers a more favorable opportunity for the study of the chromatophore theory than does sarcoma of the choroid, because here the normal chromatophore is much less heavily pigmented than in the normal choroid, or than the chromatophore in the iris. Pressure, too, destroys the normal cell. Fifth, the term leucosarcoma should be retained, but used only in reference to the clinical appearance of iris sarcoma.

Dr. F. H. Verhoeff, Boston, thought that the observations of Dr. Brown were valuable in confirming the facts upon which the theory of Ribbert is based, although they still left the theory itself open to doubt. He did not regard as valid the objection to Ribbert's theory made by Dr. Brown, that the origin of chromatophores had not been traced as far back as round cells, for

it was recognized that cells of all kinds when in an undifferentiated stage tended to assume a round form. Dr. H. V. Wuerdemann, Milwaukee, said that for purposes of diagnosis and prognosis we must discriminate between these leucosarcomata and the malignant sarcomata in a clinical way. He had found chromatophores in all the cases of uveal sarcomata he had examined in recent years. Cells containing many chromatophores, or fusiform elements, were more prone to produce themselves, and hence such tumors were more prone to recurrence than those containing cells more like the normal elements of the body, and therefore from the microscopic diagnosis a more favorable prognosis could be offered in the cases of these tumors containing chromatophores.

Dr. E. V. L. Brown, Chicago, in closing the discussion, was in accord with Dr. Verhoeff as to the uncertainty of this theory, but thought the burden of proof was for some one to show that there is a leucosarcoma that does not contain chromatophores.

The differential diagnosis and prognosis of tumors of the uveal tract. Dr. H. V. WUERDEMANN, Chicago. This paper treated the subject from a clinical standpoint, with reference to microscopic diagnosis. Tumors were considered under the headings of cysts, angioma, myoma, sarcoma, metastatic sarcoma, and carcinoma. All malignant tumors were considered as really sarcoma or carcinoma. The writer said that the division of carcinoma into leucosarcoma and melanosarcoma is microscopically incorrect, but necessary from a microscopic, clinical, diagnostic, and prognostic standpoint, as the less pigmented tumors offer a less unfavorable prognosis. In diagnosis stress was laid upon transillumination of the eye. The literature was collated to date and many original observations included.

Dr. Chas. S. Bull, New York, said there was little to criticise and much to commend in Dr. Wuerdemann's presentation. He agreed with Wuerdemann that for purposes of diagnosis and prognosis Schieck's view, that these tumors are all to be classed as melanosarcomata, could not be accepted. When it came to a question of prognosis, Schieck's conclusions were too far reaching. He thought the method of transillumination in examination of tumors of the ciliary body and of the anterior parts of the fundus was of considerable value. He differed with the essayist as to

tubercles of the choroid being accompanied by inflammatory reaction; he had rarely seen any sign of accompanying inflammation. Dr. E. S. Thompson, New York, advocated the use of the Wuerdemann lamp as being more easily managed and remaining cooler than the Sachs lamp. Dr. Edward Shumway, Philadelphia, placed himself with Dr. Bull and Dr. Wuerdemann against the theory of Schieck that all the sarcomata of the choroid are developed from chromatophores. Dr. O. F. Wadsworth, Boston, thought with regard to the prognosis in cases of sarcoma of the choroid that the estimates given by Dr. Wuerdemann were altogether too favorable; in his experience most of the cases he had been able to follow had died.

The treatment of progressive atrophy of the optic nerve, due to acquired syphilis, by subconjunctival and intravaginal injections of sublimate of mercury. Dr. CHAS. S. BULL, New York. Twenty-five cases of simple atrophy of the optic nerve due to acquired syphilis were treated by this method. Cases of tabes and disseminated sclerosis were excluded. All cases had previously undergone a thorough anti-syphilitic treatment by mercury and potassium iodide and vapor baths, and had also been subjected to hypodermic injection of strychnia. Subconjunctival injections, preceded by injection of cocaine, always made far back beyond the equatorial region, were employed. Strength of sublimate solution varied from $\frac{1}{5000}$ to $\frac{1}{2000}$. Ten minims was the minimum amount injected; maximum was 20 minims. Injections were usually made on alternate days, and if no improvement followed the tenth injection, treatment was abandoned. No permanent improvement of the vision in any case; only in three temporary improvement. This method of treatment for these desperate cases of syphilitic atrophy of the optic nerve had added nothing of value to therapeutics.

Dr. S. D. Risley commended the writer's courage in carrying out these experiments clinically, although he had arrived at negative results. He advocated the subconjunctival salt injections in diseases of the anterior segment of the globe, and had seen the entire uveal tract clear up under the action of repeated, prudently made subconjunctival injections, not of solutions of mercury, but of the so-called physiological salt solution. Dr. A. E. Hubbell, Buffalo, had had some experience along this line, though not so systematically persisted in as by Dr. Bull. His results, like those of Dr. Bull's, had been entirely negative.

Paraffin plates as an aid in operations for extensive symblepharon and the restoration of culs-de-sac for prothesis. Dr. Wm. H. Wilder, Chicago. The writer referred to the difficulty of successful treatment of severe cases of symblepharon and the necessity of grafting into the new cul-de-sac some from of epithelial membrane. Mucous membrane was not so available and not so good for this purpose as thin Thiersch grafts from the skin. These must be perfectly coapted and held in place and this could best be accomplished by some form of plate. He described the different methods in use and the author's method, which consisted of the use of metal plates coated with paraffin. The advantages claimed for this method were its adaptability, the certainty with which the graft is applied, and the lack of danger to the cornea from the plate.

Dr. Chas. H. May, New York, had had no experience with the metal plate; though in one case he had tried Hotz's plan of using a lead plate. He had been well satisfied with the porcelain supports. As to the grafts, he believes the Thiersch grafts were generally preferable to the Wolff grafts, though not prepared to say that the former should always be used. He agreed with Dr. Wilder that no sutures were necessary. Dr. C. W. Hawley, Chicago, had seen Dr. Wilder's plates used in two cases with very desirable results. He had been very well satisfied with the Thiersch grafts. Dr. John E. Weeks, New York, referred to the necessity for the flap having attachment to the periosteal tissue in order to maintain the depth of the cul-de-sac; another essential was that the plate should be sufficiently large to carry the graft to the depth of the groove in case sutures were not employed. He thought Dr. Wilder's plate met that indication fully. Dr. S. D. Risley, Philadelphia, said he knew of nothing we attempt in which success depended so much upon technique as in this operation. He had tried many methods and believed this would be a decided improvement. He was very fond of the Thiersch grafts, which he carried to the parts from the razor without putting into any solution. Dr. C. D. Wescott, Chicago, had had the privilege of assisting Dr. Wilder, and added his testimony to the simplicity of the method as compared with others.

The relation of diseases of the nasal accessory sinuses to disease of the eyes. Dr. Frank A. Brawley, Chicago. The essayist considered that periodical attacks of unilateral headache

are practically always of nasal origin, involving the frontal and ethmoidal sinuses and usually non-suppurative in type. Absorption of the contained oxygen by the lining membrane of the cells brings about a vacuum, congestion and swelling of the membrane follow, producing irritation of the nerve endings, with resulting reflex ocular disturbances. An active congestion occurs in the orbital tissues as a result of a blocking of the branches of the ophthalmic artery which supply the lining membrane of these cells. Application of adrenalin to affected middle turbinal was a specific means of diagnosis of this condition by re-establishing air communication between nose and sinuses, with resulting relief of subjective symptoms. A specific treatment was resection of anterior third of affected middle turbinal, with consequent exposure of the exits from these sinuses and permanent relief from subjective symptoms.

Dr. Nelson M. Black, Milwaukee, agreed with Dr. Brawley that these more obvious and striking forms of interdependent diseases have for a long period been recognized and treated, but it was easily seen that this relation had only been recognized by having the presence of the nasal condition forced upon the observer either by the existence of a profuse discharge, or the patient's calling attention to some existing nasal condition.

REPORT OF MEETINGS OF THE OPHTHALMOLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. W. H. WOOTTON, Secretary.

MONDAY EVENING, OCTOBER 16, 1905. PRESIDENT, DR. WILBUR B. MARPLE, IN THE CHAIR.

Dr. John E. Weeks presented a case of **epibulbar epithelioma.** The patient, J. B., aged sixty-three years, was first seen in October, 1904, through the kindness of Dr. Henry W. Wandless. The right eyeball was the site of a growth which had begun twelve or thirteen years previously, and had gradually increased in size. It extended from the caruncle over the ocular conjunctiva and on to the cornea, reaching the margin of the pupil in the horizontal meridian, extending to the vertical meridian of the cornea above and below. It presented a mulberry-like appearance, and was elevated two or three millimetres. A piece of growth was examined at the laboratory of the New York Eye and Ear Infirmary, and was found to present all the appearances of epithelioma. The cornea, where not invaded, was clear, and vision with glasses was 20/30.

In March, 1905, the patient was referred to Dr. George S. Dixon, of the New York Eye and Ear Infirmary, for treatment by means of the X-ray. Since that time eighty-four exposures to the X-ray have been made, the average duration of each exposure being seven minutes. The growth resisted the influence of the X-ray until perhaps thirty exposures had been made, when it began to disappear. At the present time there remains only a small, thin islet at the upper margin of the cornea, measuring perhaps 2.5*mm* in diameter. The patient has experienced no pain as a consequence of the exposures; there has been no burning of the eyelid or of the tissue of the eye.

The fundus of the eye is normal. There is a slight haziness of the outlines of the optic disk above and to the temporal side, but this is well within the physiological range. The vision remains the same.

The tube employed in treating this case was a Gundelach of medium tension, placed at ten inches from the eye of the patient, and so screened that the rays impinged on the eyeball and lids only.

The case illustrates the toleration of the X-ray by the tissues of the eye.

Dr. WILBUR B. MARPLE presented a case which he had shown at the February meeting of the Section, and which had been under treatment by the X-ray, more or less, ever since—in order to show the effect of treatment. Inasmuch as this treatment had been carried out by Dr. George S. Dixon, he had hoped Dr. Dixon would be present and report the case himself; the Doctor, however, was unable to be on hand this evening.

The patient had been under treatment for about four or five months; every day for four months, then every other day, and the séances had lasted about five minutes each time. Dr. Dixon had not made these longer for fear of injuring the eye, although the sight was so poor that possibly the séances could have been lengthened without having any effect on the sight. The treatment was continued until about the end of August, when Dr. Dixon had made the note that the eye was well. At the end of ten days or two weeks, however, there was a slight relapse.

The condition has certainly been very much improved, although there is still a little infiltration below the cornea.

Dr. ARNOLD KNAPP presented a patient, a girl, nine years of age, upon whom he had performed an **exploratory Kroenlein operation** on February 9, 1905, on account of an exophthalmos with optic neuritis, with an obscure etiology of traumatism. The operation revealed a distention of the sheath of the optic nerve with blood (**hæmatoma of the sheath of the optic nerve**). Upon evacuating this the exophthalmos was reduced. After the operation the old condition returned, and at present the eye protrudes more. The vision at present is 20/40; distinct optic neuritis; no contraction of the field; no other symptoms.

The case is presented with a view to eliciting the opinions of the members of the Section as to what had best be done.

Dr. ARNOLD KNAPP also presented a woman, twenty-eight years old, from whose **orbit** an **osteoma** had been successfully removed on August 30, 1905, without implicating the eyeball. The bony tumor was situated behind the eye, causing exophthalmos. It was nearly round in outline, measured 2.5*mm* in diameter, and was attached by a very small root of perhaps 0.5*mm* to the upper and anterior portion of the os planum of the ethmoid bone. The attachment was so slight as to make the removal of the tumor very easy. The periosteum was found to be adherent all around the neck of the tumor. The cosmetic result of the operation is excellent; there is no deformity whatever; the diplopia is diminishing; to-day it is present only in the lowest part of the field.

Dr. W. B. MARPLE also presented, for Dr. R. G. REESE, a patient suffering from **arterio-venous aneurism,** recurring after ligature of the carotid artery.

The patient was a man, twenty-one years old, who had pulsating exophthalmos, right eye, for seven years, due to traumatism. Three years ago the common carotid, right side, was ligated with no result. At present the eye protrudes. Veins all over side of head tortuous and dilated. Deep furrows can be felt in cranial bones which the pulsating vessels have chiselled out. A distinct bruit can be heard all over right side of head, and with gentle pressure over the ligated carotid the bruit disappears. Since he presented the case Dr. Rogers has operated and found that the common and external carotid and internal jugular vein were obliterated, and the collateral circulation had been established through the lingual. He tied the internal carotid and lingual a week ago, and the eye had receded very much, no bruit and no unpleasant symptoms whatever.

Dr. LINN EMERSON presented a patient in whom **amblyopia ex anopsia** had improved within thirty days of injury to the better eye.

W. R. C., aged eleven and one-half years, was seen April 4, 1905, with a history of severe headaches while in school. The ophthalmometer showed no astigmatism. Vision was 20/15 in the left eye, and he accepted + 0.5 sp. In the right eye vision was but 20/70, and was not improved by glasses. As no apparent reason for this reduction in vision could be ascertained, a solution of atropin was given with instructions to return after four days for a more careful examination,—at which time

D. V. = 20/50 w + 1.25 s.; S. V. = 20/15 w. + 1.00 s. A most careful examination of the interior of the eye failed to explain the amblyopia. Patient was given D. + .75 s. + .50 s. As no history of squint or of injury could be obtained, the opinion was given to the family that it was a congenital case which would grow neither better nor worse.

On June 23, 1905, while indulging in a premature Fourth of July celebration, he put a fire-cracker in a bottle, which exploded in close proximity to his face. A long splinter of glass (which I did not see) pierced the left upper lid, perforating the globe at the corneo-scleral margin, giving rise to considerable prolapse of the iris. The cornea was also cut in several places by smaller pieces of glass, but none of the other wounds was perforating. Within two hours of the injury the prolapsed iris was excised and a proper dressing applied. The distress of the family was augmented by the fact that the "good" eye was the injured one. The case made satisfactory progress, and on July 17th the vision in the injured eye was 20/100. The patient then stated that his other eye had improved, and I was surprised to find vision 20/20 − 2.

On July 31st it had risen to 20/20 − 1, and on Sept. 8th, D. V. = 20/20 +; D. S. 20/40 − .

Dr. E. GRUENING, referring to Dr. A. Knapp's case, thought, if an actual recurrence had taken place, the tumor could be reached again by an incision severing the externus without repeating the Kroenlein operation. Sufficient room would be obtained in this way to allow a piece of the sheath to be excised.

Dr. F. N. LEWIS thought that after evacuation of the blood the employment of a tight pressure bandage would be advisable.

Dr. L. HUBBELL, of Buffalo, thought that if the diagnosis of a recurrent hæmatoma were accurate, Dr. Gruening's suggestion was very good; but, in his opinion, drainage might be attempted through a hole in the bone flap. He thought that possibly a cellulitis might be the cause of the return of exophthalmos.

Dr. EDGAR S. THOMSON stated that in two cases in which he had performed Kroenlein's operation for the removal of an orbital tumor, exophthalmos had persisted after the operation, and, in fact, had been as marked as it was before. He thought that this might be due to thickening of the orbital tissues.

Dr. M. L. FOSTER had seen slight exophthalmos persist, but

it had been so slight that it was only noticeable on close inspection.

Dr. J. E. WEEKS had never seen a case of post-operative exophthalmos, and, as far as he knew, the records of other operators had not described it.

Dr. A. KNAPP had never before seen a return of exophthalmos after a Kroenlein, but was loath to make another attempt, and did not think there had been a cellulitis.

Dr. J. E. WEEKS asked if a blood examination had been made.

Dr. A. KNAPP responded that it had not.

Dr. W. B. MARPLE did not think that a Kroenlein operation was apt to be followed by exophthalmos.

There was no discussion of the other cases.

Dr. M. L. FOSTER read a paper entitled **case of chronic inflammatory glaucoma; iridectomy; onset of acute glaucoma three days later; a second iridectomy followed by sympathectomy.**

A woman, forty-eight years old, had originally consulted him on account of presbyopia, and was found to have the characteristic symptoms of chronic glaucoma, which, apparently, was non-inflammatory. The glasses which were prescribed relieved all the subjective symptoms which led the patient to seek relief. There was no change in the glaucomatous condition for six months, no inflammatory symptoms appeared, the vision did not fail, and the fields became no smaller. About the end of that time a small foreign body was removed from the cornea of the right eye, the irritation thus produced persisted, and, six days later, iridectomy was performed on both eyes because of plus tension and ciliary injection of each. Both eyes seemed to do well at first, the left went on to uninterrupted recovery, but three days after the iridectomy an acute attack of glaucoma supervened upon the right.

Heat and eserine were of no avail, so a second iridectomy was performed on the right eye six days after the first. This relieved the pain, but otherwise seemed to have no effect. After this operation eserine increased instead of relieving the pain of the glaucoma. A month later the superior cervical ganglion of the sympathetic on the right side was removed. This operation was followed very slowly by its usual sequelæ. Sixteen hours after the operation there was a slight ptosis, a slight facial paralysis,

and less redness of the eyeball, but the tension was unchanged. Three days later the tension was about the same. Ten days after the operation the tension had fallen somewhat, and in less than three weeks it had become normal. Eight months later the eye had become blind, and was again hard and painful. It was enucleated.

Dr. FOSTER called attention to several peculiarities of the case. It demonstrated that a person suffering from glaucoma may be fitted with glasses without suspicion that any disease exists. The disease remained stationary for six months after it came under observation, and seemed to have been excited into activity by a trivial injury of the cornea. The iridectomy, which was successful in the one eye, was followed by an attack of fulminating glaucoma in the other, which yielded neither to antiphlogistic measures nor to a second iridectomy. The sympathectomy was gradually followed by a retrogression of the tension, instead of the instantaneous fall to be expected, and in several minor respects the effects produced varied from those heretofore reported. This slow fall of the tension, with the other variations from the natural sequelæ of the operation, together with the fact that there was no definite pathological lesion in the excised ganglion, and the further progress of the disease seem to indicate that the glaucoma was not dependent on any pathological condition of the sympathetic nervous system and was unaffected by the removal of the superior cervical ganglion.

In the discussion, Dr. F. N. LEWIS asked if cocaine had been used to extract the foreign body. If so, he thought this might have started the glaucoma.

Dr. FOSTER responded that it had, probably in 2 % solution.

Dr. E. GRUENING doubted that cocaine increased the tension. The internal administration of the fluid extract of jaborandi in large doses did at times great good in the most desperate cases, or pilocarpine used hypodermically.

Dr. MARPLE stated that not infrequently, after an iridectomy for glaucoma, the anterior chamber would reform too rapidly and the tension would increase. The daily opening of the anterior chamber with a spatula was of service in these cases.

Dr. M. FOSTER had used salicylate of soda in these cases to produce diaphoresis.

Dr. E. GRUENING stated that the depressing action of jaborandi on the heart had been very much exaggerated. If given in

hot coffee, the dose could be gradually worked up to forty drops even in old people.

Dr. HUBBELL wished to verify Dr. Gruening's statement in regard to jaborandi. After an iridectomy he had seen an apparent aggravation of the glaucoma from the use of eserine, and had had to suspend its use and substitute pilocarpine.

Dr. EDWARD B. COBURN read a paper entitled **pyæmia, orbital cellulitis, and death, following the use of mesotan.** A woman, aged thirty-one, had complained of severe pains in the back and abdomen for six months. To relieve the pain in the back she was advised to use mesotan, which was rubbed in repeatedly. Whether it was used pure or diluted is unknown. Her condition became worse, pains were general throughout the body, and for a time she could not move the left leg. Four days later she had convulsions, and her right eye began to swell. At different times she was delirious. She was removed to Roosevelt Hospital, where her temperature on admission was 104⅕°, pulse 128, respiration 52, with albumin and casts in the urine. Blood-count showed 35,000 leucocytes. A clinical diagnosis of abscess of the back with general pyæmia was made. The eyelids were swollen, the conjunctiva chemotic and protruding between the lids; the eyeball was pushed forward and was immovable and stony hard. The pupil was dilated and did not respond to light. Ophthalmoscopic examination showed the retinal veins much enlarged.

This complication was diagnosed as metastatic orbital cellulitis. Operation on the back seemed imperative, and was performed at once, local treatment of the eye being temporarily suspended. Exploration of the lumbar region and kidney revealed only superficial foci of pus containing streptococci. The patient's condition grew worse and death occurred the following morning. At the autopsy, multiple small abscesses were found in the liver and kidney and an anatomical diagnosis of pyæmia was made. Mesotan sometimes causes a vesicular eruption. Whether infection occurred through the channels thus opened or whether the mesotan was simply an incident in the case, it is impossible to state.

The Section adjourned by limitation.

MONDAY EVENING, NOVEMBER 20, 1905. PRESIDENT, DR. WILBUR B. MARPLE, IN THE CHAIR.

Dr. F. N. Lewis presented a case of **trachoma with pannus treated with jequirity powder.**

The patient, seventeen years old, gave a history of having gotten sore eyes eight years before, for which he was treated with bluestone, hot water, and other applications. Since that time he has been under treatment at various hospitals and dispensaries. All forms of treatment have been employed. At times there has been some improvement, but case always returned to the former bad condition. He was admitted to the Manhattan Eye, Ear, and Throat Hospital on January 24, 1905. Both eyes were affected with pannus to an extreme degree. The lids were thick and swollen. There was much lachrymation and photophobia. The palpebral conjunctivæ showed thick, firm granulations. Vision in each eye was reduced to perception of light. Powdered jequirity was rather freely dusted on the eyeball in the afternoon and again at night. The following morning there was an increase of swelling of lids with muco-purulent discharge. Cold applications were employed with frequent cleansings with boracic acid solution, and atropin in castor oil was instilled.

Two days later the same treatment was followed in the other eye. In the second eye the swelling and discharge were such that for two or three days it seemed as if a bad result would follow. But both eyes improved rapidly. The pannus disappeared, the eyeballs became free from redness, photophobia disappeared, the lids improved, and the time the patient left the hospital, February 13, 1905, there was vision of 20/100 in one eye and 20/200 in the other. Treatment was continued with bluestone, and later with bichloride of mercury solution (1 : 500) rubbed into the palpebral conjunctivæ. Atropin was also used. At the present time the eyes give little trouble, although at times, as recently, after a cold in his head, one eye showed some indication of return of the inflammation. He is still being treated, but states that the eyes have never been as well as at present, and the appearance of the eyes is in every way quite satisfactory when you consider the former condition. The vision now is 20/70 in one eye and 20/50 in the other.

Dr. H. W. Wootton presented cases illustrating **recent and**

remote results of advancement of the externi for convergent strabismus.

The first case had been operated upon five years ago by Dr. Wootton's method. There was binocular fixation for all distances and binocular single vision by every test. The patient could overcome a 7-degree prism in abduction, and the power of convergence was normal.

The second case, operated upon by the same method three and one-half years ago, had binocular fixation for all distances; orthophoria for distance; could overcome a 4-degree prism in abduction. He could not practise bar reading.

Two recent cases operated upon by the modification of Dr. Wootton's advancement, devised by Dr. J. J. Thomson, were also shown.

The first was of about eight months' standing. The second of two months'. They possessed binocular fixation; neither had any degree of binocular single vision. Convergence was perfect in both. They were exhibited to show the condition of the conjunctiva at this period after the operation.

Another case was also shown to illustrate the theory that this operation is improper unless a well marked secondary divergent paresis is present. The patient was first seen some five years ago. He then had convergent strabismus of 25 degrees. Full correction under atropin was prescribed. A few months later, as his record shows, the eyes were nearly straight with the glasses. Notwithstanding this, both externi were advanced, with the resulting well-marked divergence which has persisted ever since, and it is only by wearing a markedly under-correction, which gives him symptoms of accommodative asthenopia, that the eyes are apparently straight.

In the discussion which followed, Dr. CHARLES MAY stated that he had been favorably impressed by the results of double advancement done for convergent strabismus. He had performed the operation twelve or fourteen times under local anæsthesia, and, so far, had had no cause for regret. Dr. Wootton's cases showed some fulness over the muscles, but he thought there was not so much in cases operated upon by Worth's method. Worth did not employ the middle suture, which he thought interfered with the blood supply.

Dr. W. B. MARPLE had performed Worth's operation, but had found it difficult to remove the sutures; he had understood

that Worth had modified his method of introducing the sutures.

Dr. F. N. Lewis thought that one great point in favor of double advancements was that the convergent power was retained in addition to the good cosmetic result produced by the non-sinking of the caruncle.

Dr. Alexander Duane stated that an advancement increased the power of action of the muscle advanced, but that it also hampered to some extent the action of its opponent, and that this was a fact to be reckoned with. A thorough tenotomy resulted largely in a paresis of the muscle cut, and did not materially increase the action of its opponent. So the two operations were not exactly opposites. In one of Dr. Wootton's cases he thought the action of the interni was limited to a slight degree.

Dr. E. Gruening stated he would like to see more cases. The six shown, although successful, were hardly sufficient. He thought that possibly we saw only the brilliant results.

Dr. Wootton, in closing the discussion, stated that in some cases the operation was not advisable, and in some contra-indicated. For instance, in extreme amblyopia, only a cosmetic effect would be obtained, and as ultimate divergence was practically certain to result from either a tenotomy or an advancement, and as a tenotomy was infinitely the easier operation, it hardly paid to do an advancement.

In cases in which the eyes were straight for distance with correction, probably no divergent paresis existed, and the operation was contra-indicated.

Dr. E. L. Meierhof presented a patient illustrating the **value of orthoform as a local anæsthetic.**

The treatment of lime-burn of the cornea and conjunctiva by orthoform.

The man was presented to show the beneficial effect of orthoform in allaying the great suffering induced by burning of the cornea and conjunctiva by lime. This was the fourth case of its kind in which Dr. Meierhof had had the opportunity to test the effect of the drug. The orthoform is dusted into the injured eye and allowed to remain until washed away by the tears. It is best to precede the application of orthoform by a 4 % solution of cocaine, as the first effect of the orthoform in the eye is very irritating ; but in twenty or thirty minutes, when

the cocaine has lost its influence, the orthoform will have asserted itself. Two or three insufflations a day are all that will be necessary for a few days. Orthoform can be made up in an emulsion of 10 to 20 % and applied to the eye in the form of drops. The powder without admixture of any other substance was used in this case.

Dr. CHARLES J. KIPP, of Newark, N. J., read a paper entitled, **euphthalmin conjunctivitis.**

Euphthalmin I have used quite extensively in private practice as well as in the hospitals, for the purpose of dilating the pupil sufficiently to make a satisfactory ophthalmoscopic examination. I have used one or two drops of a 5 % solution for this purpose, usually but once, but in a few patients have repeated the instillation several times in the course of a year, and have never seen unpleasant results follow its use when applied in this manner. Recently I have had, however, a case in which the remedy was applied twice daily, continuing for four weeks, and in this instance a blepharo-conjunctivitis was apparently produced by it. In no other case have I used the euphthalmin continuously for days. The case is as follows: Mr. T. G. A., seventy-five years of age, was seen by me for the first time five years before this visit in 1905. His vision at that time was R — M. 2.5 D. S. = $\frac{6}{30}$ L — M. 2 S. = $\frac{6}{60}$. In both eyes the anterior parts were healthy. The vitreous body was full of floating membranous opacities the optic disks could only be made out with difficulty, but appear normal. I did not see him again until September 30, 1905. On this date I found that he had in both eyes an opacity in the centre of the cornea, which covered the pupillary area. The opacity was round in form and resembled the so-called ribbon-shaped opacity seen in eyes with deep-seated affections more than anything else. His vision was so greatly reduced that he had difficulty in finding his way. The tension of the eye was normal. To enable me to make an ophthalmoscopic examination, I put a drop of a 5 % solution of euphthalmin in each eye, which had the desired effect. I found the vitreous body much clearer and a very large ring of atrophy of the choroid around the disk in both eyes. His vision was very greatly improved with the moderately dilated pupil. It was now R — M. 2.5 D. S. = $\frac{6}{18}$. L — M. 2.5 D. S. = $\frac{6}{24}$. I prescribed for him euphthalmin hydrochlorid in a 4 % solution, and advised him to instil a drop in each eye morning and afternoon. Five weeks later he returned to me.

In both eyes, both lids were very œdematous, and in parts covered with dried crusts. There was a much dried secretion among the cilias. The conjunctiva of the upper and lower lid of both eyes was swollen and covered with numerous enlarged follicles. The cornea was not affected. I learned from the patient that he had used the instillation for about four weeks before any unpleasant symptoms showed themselves; at that time swelling of the lids began, then eyes became somewhat painful, and an abundant discharge of muco-purulent secretion followed. He attributed the new condition to the effects of the euphthalmin, and stopped the instillations. In the course of a week the inflammation had greatly subsided, and, as he desired to see again as well as he had while using the euphthalmin, concluded to resort to it again, but before doing so he prepared for himself a 2 % solution by mixing equal quantities of boiled water and of the 4 % solution in another bottle. He again instilled a drop of this new solution twice daily for a few days, but had to give this up as the swelling of the lids and the amount of secretion from the conjunctival sac had become much greater than it was ten days before. Fearing that atropin had been substituted for the euphthalmin prescribed by me, I had him bring to me the bottle containing the solution he had used. The label showed me that it had been prepared by a reputable apothecary, who, by the by, turned out to be a near relative of the patient. I visited the apothecary, saw my prescription (it called for euphthalmin hydrochlorid gr. v.; aquæ distill.), and also saw the vial from which the euphthalmin had been taken. The label on the vial was as follows: "1 gm. euphthalmin hydrochlorate, U. S. A. Patent No. 663,754, dated December 11, 1900." I also had a bacteriological examination made of the solution used by my patient, and Dr. R. N. Camolly, who kindly made the examination, reported as follows:

"Examination of the eye solution received from you shows that it contained a common mould, mucor, and a small bacillus, in shape and size resembling the colon bacillus, but it did not produce fermentation in glucose bouillon, and, consequently, is not the colon bacillus. This bacillus does not resemble any of the pathogenic germs with which I am familiar, and so far I have not been able to identify it. The above were the only microorganisms found."

The facts here stated leave but little room for doubt that

the conjunctivitis was caused by the euphthalmin and not by impurities contained in the solution.

It is well known that solutions of atropin will, after prolonged application to the conjunctiva, in some persons, produce a conjunctivitis, with or without so-called granulations, and a dermatitis of the lids, and I have seen the same follow the use of solutions of duboisin, eserin, and cocaine. (I have not yet seen a conjunctivitis follow the very prolonged use of strong solutions of pilocarpin hydrochlor.) Some writers hold that a conjunctival affection is never seen if the sterile solutions are used, but this is an error, as I have seen the same form of conjunctivitis and dermatitis develop in patients in hospitals in which the solutions were made fresh daily. Lewin and Guillery, in their recent exhaustive work, *Die Wirkungen von Arzneimitteln und Giften auf das Auge*, vol. i., page 198, after reviewing the whole literature on this subject, express their opinion that the so-called atropin conjunctivitis is simply a drug eruption, the form of which is determined by locality, and that its development is solely dependent on an individual predisposition; they think that this is conclusively proved by the fact that in many persons thus stigmatized similar changes in the conjunctiva are produced by the application of other tropinæ. I have no doubt that the above applies also to euphthalmin conjunctivitis. The short duration of the mydriasis produced by euphthalmin, together with the high price of that drug in this country, has probably prevented its extensive and protracted use in cases where permanent dilatation of the pupil is desired, and this may be the reason why a conjunctivitis from its use has not been more frequently observed.

The only mention of conjunctival affection resulting from the instillation of euphthalmin that I have been able to find in literature is by Dr. H. Knapp, who, in the discussion following the reading of a paper by Dr. H. M. Starkey on the use of a mydriatic after the age of forty-five, stated that he had seen a case of atropin granulation develop after the daily use for six months of a solution of euphthalmin. No particulars are given. He stated that this case suggested to him the idea that euphthalmin was in all respects a weak atropin, but on using it in a patient with well-marked idiosyncrasy against atropin it failed to produce erythema or any other irritation.

In conclusion I may state that the conjunctivitis and dermatitis in my case disappeared entirely in the course of three weeks

after discontinuance of the euphthalmin, under the use of weak solutions of zinc sulphate and zinc oxide ointment. During the last month my patient has been using daily a 1:2000 solution of scopolamin, which had not as yet produced conjunctivitis.

Dr. J. A. LIPPINCOTT, of Pittsburg, Pa., read a paper entitled, **Intraocular irrigation: its advantages and technique.**

History.—Saint-Yves in 1722 irrigated the anterior chamber in cases of hypopyon. Fifty years later Guerin Sommer and others removed cortical remains by this method. During the nineteenth century the procedure was practically in abeyance until it was revived in 1884 by McKeown and Inouye, who were followed by Vacher, Panas, Wicherkiewicz, etc. Early American literature on the subject scanty, consisting of one paper by Williams, of Boston, and several by the writer. Recently irrigation has been more freely discussed and its adherents have become pretty numerous.

Objects and Advantages.—In hypopyon, lavage is sometimes useful in disclosing the presence of a foreign body in the anterior chamber or posterior chamber, thus revealing the source of infection. Even in the absence of foreign substances, irrigation is of service in many cases, and the writer has never seen bad results from it.

Intraocular irrigation is, however, chiefly employed to secure a more perfect technique in the extraction of cataract. Its advantages are such as might be expected from a prompt and usually thorough removal from the interior of the eye and the lips of the wound of cortical matter, blood, air-bubbles, and shreds of capsule by absolutely gentle means. The immediate advantages are obvious—the blackness of the pupil, the avoidance of injury to the wound edges by stroking the cornea, the restoration of the corneal dome in cases of inversion from lack of tone, the smooth replacement of an iris that tends to prolapse, etc. The remote advantages are rapid union from perfect cleansing of the lips of the wound, diminished tendency to secondary cataract and also to post-operative inflammations. Irrigation is contraindicated in cases of actual or threatened escape of vitreous; and it is not required when the lens is intact on emerging. It is especially useful in traumatic and immature cataract, in partial lenticular opacities associated with choroidal disease, and in high myopia amenable to operation.

Solutions Employed.—Various fluids have been injected.

Panas, aiming at antisepsis, used biniodide of mercury. De Wecker, for its effect on the iris, injected salicylate of eserin. Neither of these authors approved of lavage as a means of mechanically cleansing the eye. The latter idea was advocated by McKeown, who employed the physiological salt solution, and whose views are now generally adopted. Lagrange, seeking a more perfect approximation to the aqueous humor, adds minute quantities of sulphate of potash and chloride of calcium.

The instruments used for intraocular irrigation are of three types—1st, piston, 2d, rubber-ball, and 3d, gravity syringes. Piston and rubber-ball syringes present difficulties as regards asepsis on account of the back current set up in refilling. Piston syringes are apt to be out of order when needed. The rubber-ball syringe may throw bubbles of air into the eye. In neither of these forms can the force of the current be accurately estimated. Both forms are difficult to manipulate with the precision desirable in all operations on the eye. Of the two, the rubber-ball syringe is, on the whole, the less objectionable. The Williams syringe, which is really in a class by itself, the fluid being propelled by blowing into the reservoir, is open to objection on the score of asepsis and as to the estimating the force of the current. Finally, a properly constructed gravity syringe fulfils all the conditions demanded. The penholder handle, which is the distinguishing feature of the writer's irrigator, in his opinion, utilizes all the dexterity of the most skilful surgeon, and minimizes, instead of aggravating, the deficiencies of those less gifted. In using this instrument the reservoir, containing the physiological salt solution at a temperature of several degrees above that of the blood, is held from eight to ten inches higher than the patient's face. After expulsion of the nucleus, the fluid is allowed to flow until it is at blood heat on emerging. Controlling the current by means of the forefinger resting on the exposed portion of the rubber tube, the operator introduces the tip, and slowly moves it from one end of the incision to the other. It is sometimes necessary to push the tip farther, so as to reach behind the iris, and to bring it into contact with obstinately adhering masses of cortical, thus aiding the dislodging force of the stream.

In the discussion which followed, Dr. H. KNAPP stated that he had always employed syringes with an asbestos packing, and had

seen no infection. His own syringe was simple, but he thought good. It resembled a small Anel's syringe, and he thought it sufficient.

Dr. S. B. St. John, of Hartford, Conn., had used Dr. Lippincott's syringe; he did not think the method dangerous, and always employed it when he considered it necessary. He used a physiological salt solution, and had never seen any irritation that could be ascribed to it. He had had some cases of striped keratitis, but they had all cleared up rapidly. He frequently introduced the nozzle behind the iris when suspicious that fragments might be there. He did not use Dr. Lippincott's handle, but merely the tip attached to the tube, and controlled the flow by the thumb and finger. If the pressure in the anterior chamber became too great the tip should be raised, thus opening the wound and releasing the pressure. The toilet of the wound was most thorough when this method was used, and he thought that it was absolutely necessary when sticky debris remained, and when the operator thought that further stroking of the cornea would be dangerous. The greater part of the soft lens matter he removed by stroking, and afterward employed irrigation. He had never employed the method in cases of hypopyon, but intended to do so.

Dr. P. A. Callan thought the method very advantageous, particularly in cases of soft and traumatic cataract, and also for removing remains in ordinary senile cataract, but the best results were obtained in the first two. He used a rubber-ball syringe with a flattened glass tip. Air bubbles did go in, but apparently did no harm. His tip produced a rotary stream, and he thought this simple apparatus better than the complicated gravity device.

Dr. T. R. Pooley had only employed irrigation in cases of extensive loss of vitreous, and in these cases he had injected the normal salt solution into the anterior chamber with the idea of restoring the tension. In normal cataract extraction he did not use it; he thought it rather meddlesome and unnecessary. If the extraction had been as thorough as possible, there was less danger from small fragments remaining than there was from introducing another instrument into the wound, which enhanced the chance of infection. He thought that the method would not stand comparison as a matter of routine. When the lens contained a foreign body the practice was to be condemned.

Dr. J. H. Claiborne had never had any satisfaction from irrigation. He thought Dr. Lippincott's instrument was probably

the best for the purpose, although he did not like the handle. In a case which had been irrigated, he had seen infection take place on the fourth day, and a case in which irrigation had been performed with but slight pressure with a pipette had resulted in extensive iridodialysis, and this was a possible danger in lavage of the eye.

Dr. E. GRUENING objected to the irrigation as a routine method. When used, he thought that the simple bulb syringe fulfilled all indications. In a mature or hypermature cataract, the method should not be required. With the long peripheral or "T"-shaped opening in the capsule, the soft lens matter could easily be extracted, and lavage was not necessary. It must, of course, be admitted that in sticky cataracts the method was indicated, and Dr. Lippincott's apparatus fulfilled every indication. Still he thought the simpler bulb syringe better.

Meeting adjourned.

MONDAY EVENING, DECEMBER 18, 1905. PRESIDENT, DR. W. B. MARPLE, IN THE CHAIR.

Dr. DAVID WEBSTER presented a case of **astereognosis** in which eye symptoms were present.

Dr. Webster's report of the condition of the eyes was as follows: The patient, Mr. Jacob C. Gough, came under my observation on the 29th of August, 1905. He gave a history of gradual loss of eyesight, beginning about two and a half years previously. He could go about alone up to about a year ago. For the last year he has seen just about as he sees now. The usual tests show that he has little more than perception of light. If a hand is held up before his eyes without throwing a shadow upon them he sees that something is there, but cannot tell what it is. The same is true of any other object held up before his eyes. He cannot count fingers at any distance or in any position, but he makes his way about the ward and never runs against anything. If you stand in his way he carefully avoids you and goes around you. It seems fair to suppose, then, that while he actually sees objects he is unable to distinguish their form, just as with his hands he feels objects but fails to recognize them, having lost the sense of form.

In other words, he seems to have visual astereognosis, as well as tactile astereognosis. The ophthalmoscopical appearances show

no reason for his loss of vision, the media being transparent and the optic disk and fundus oculi being normal. As to the etiology, he denied to me the excessive use of alcohol and tobacco, and declared that he never had venereal disease. I failed to discover any cause for the disease, unless it might be attributed to financial worry and anxiety. He had been worth two or three hundred thousand dollars and had lost it all, including his wife's fortune, not long before the impairment of vision set in. He is fifty-five years old, and is married to his second wife. He has several children by his first wife, all of whom are healthy adults. His pupils are of medium size and respond actively to light. There is no history of a fall or blow on the head.

The patient took 100 minims of fluid extract of jaborandi every night for two months. No smaller dose would make him sweat. This treatment did not seem to do him any good, and for the last month he has been on iodide of potassium, in increasing doses, with some apparent benefit.

Dr. J. F. TERRIBERRY, in describing the nervous symptoms present, stated that the patient gave a specific history, and that for twelve years he had used alcohol in excess; he was not a steady drinker but drank hard at certain times. No history of rheumatism or malaria. No history of nervous diseases in the family. The neurological side of the case commenced about one year ago, when he began to use his hands awkwardly. Has been free from irritative or compressive brain symptoms. No symptoms pointing to neoplasm. Alimentary tract in good condition. Mental reflexes perfect, possibly a trifle slow. Muscular reflexes present but somewhat subnormal at night.

At the last examination the left patellar reflex was exaggerated. Ankle-clonus reduced. Muscular irritability exaggerated. Chin jerk obtained. In raising hands above the head, the right hand would always be raised higher. Tactile sensibility slow. When the patient was touched upon the arm he could not place his finger where he was touched. Contact was perfectly received, but slowly recorded. When one moved his right hand the patient could only guess which hand had been moved. He had a tendency to resisting passive movements, especially on the right side. In fact, he executed no movement correctly. Muscular sense was practically gone, also, in the lower extremities, particularly below the knee. The typical symptoms of the disease (which is an inability to recognize the character of objects by touch) were

well marked. Imperfect sense of location in the face, particularly in the lower part. Patient could always distinguish heat from cold. The spacing sense was lost. Taste, smell, and hearing normal.

The dynamometer gave 60 with the right and 70 with the left hand. The case had begun with blindness, as Dr. Webster stated, the astereognosis coming on two years later. The lesion was apparently progressive.

In the discussion which followed, Dr. LEZYNSKY stated that the interesting feature of the case was the astereognosis. As to the condition of the eyes, the lesion must be back of the corpora quadrigemina, probably in the cortex. Blindness was not an essential feature of astereognosis.

Dr. P. A. CALLAN presented a case of **infantile glaucoma.** Mary Egan, sixteen years, United States. As a child parents noted that she was near-sighted. When eight years of age, wore glasses for myopia. Two and one-half months ago came to New York Eye and Ear Infirmary. O. D. Blind. O. S. — 10.00, 20/20. Ophthalmoscope showed marked cupping of both nerve heads. Left field very much contracted; green wanting. Two months ago made an iridectomy well back in sclera. Vitreous presented. On second day after operation saw large detachment of retina with choroidal hemorrhage under the raised retina. Hemorrhages around optic nerve in retina, small and striated. At the end of six weeks after operation, retina replaced. No hemorrhage. Case shown to illustrate the advantage of small scleral opening *versus* large cut at limbus.

With latter, enucleation would have been necessary. It was not deemed wise to operate on O. S.

Dr. W. P. MARPLE presented a **modification of Dr. Dennett's electric ophthalmoscope.**

In doing this he stated that he had been unable to use Dr. Dennett's ophthalmoscope satisfactorily, for the reason that the instrument seemed not to illuminate the lower half of the eye, as it should in the direct image. After various experiments, Dr. Marple found that the reason for this was that the mirror was entirely below the line of vision in using the instrument. He tried first a complete mirror, with a central round aperture, as in the ordinary reflecting ophthalmoscope, but found there was so much light reflected around this aperture from the electric lamp, that he could not use it.

He then used a mirror shaped something like the letter "U," that is, one in which all above the aperture had been removed. With this instrument he found that he could illuminate the eye very much more satisfactorily—in fact, as much so, if not better, than with the ordinary reflecting ophthalmoscope.

He had also introduced into the instrument another modification, the suggestion for which he was also indebted to Dr. Dennett's instrument. In the latter instrument the lamp could be shifted, and used in two positions, but the shifting had to be done when the instrument was not in use. By carrying a little rod down, connected with the lamp, at the end of which was a small roughened ball, Dr. Marple succeeded in making the movement of the mirror subject to his control while using the instrument in front of the patient's face. This he had found a very decided advantage. While examining the patient this little ball referred to above was held between the thumb and index finger of the hand holding the instrument, and the lamp could thus be shifted up and down, until the examiner got just the position which gave him the best form of illumination. The instrument will be still further improved by having a lamp, the filament of which, instead of being linear, will be round. This, Mr. Meyrowitz is having made.

The instrument as thus modified or improved is an exceedingly useful one, and Dr. Marple said that he used it almost exclusively now, instead of the ordinary reflecting instrument, so that, instead of being an ophthalmoscope which one might use when one could not use any other, it was an instrument which had many advantages for all purposes, where an ophthalmoscope is used.

He was greatly indebted to Mr. E. B. Meyrowitz (by whom the instrument is made) for many courtesies in perfecting it. It can be attached to any form of instrument.

Dr. E. S. Thomson presented a case of **conjunctivitis, following traumatism, and accompanied by swelling of the lymphatic glands of the neck.** The history was as follows:

J. L., aged twelve years, about a month ago was shooting a small 22-calibre rifle when the breech blew open, and he was wounded on the lower ocular conjunctiva of the left eye. He was treated, but did not improve, and at the end of a week the lymphatic glands in front and below the left ear began to swell. On his admission to the hospital, there was a thick roll of swollen conjunctiva extending up from beneath the lower lid, but, strange

to say, no swelling of the conjunctiva above the cornea. The swollen part was covered with "marbled" markings of subconjunctival purulent invasion. The glands were markedly swollen and tender, and the temperature ran up to 100°. The blood count gave no information of value. Urinalysis was negative. The conjunctiva was opened, and a culture taken which proved to be purely staphylococcus pyogenes albus. The interesting feature of the case is the limitation of the conjunctival process with the severe lymphatic involvement.

Dr. H. KNAPP presented a **specimen of the anterior capsule of a lens which he had extracted for cataract caused by particles of granite in the lens capsule.**

Man, a stone-cutter, who had had a cataract in the left eye, caused by fine granite particles in his lens. Before the operation four white spots were seen in or just behind the anterior capsule. The lower part of the iris was tremulous. A lower section of the cornea was made through the limbus, and the lens was removed by seesaw pressure with a spoon above and a wire loop below. The cataract escaped with the capsule, without loss of vitreous. The iris fell back in its place, and the healing and results were ideal. Vision good. Dr. Knapp said he would publish the case in detail.

Dr. E. L. OATMAN exhibited **lantern slides illustrating the method of epithelial cyst formation in the iris.**

The paper is published in full in these ARCHIVES, vol. xxxv. No. 4, pp. 309–317.

Dr. OATMAN presented a case of **cataract extraction, followed by eversion of flap and epithelial invasion of anterior chamber.**

Patient, male, aged sixty-four. Mature cataract in O. D. May 30, 1905, the lens was satisfactorily removed by the combined operation. An old trachoma had resulted in such shrinking of the conjunctiva that the fornix would not retain a speculum during operation. Forty-eight hours later, when the dressings were first removed, the corneal flap was found entirely everted, completely covering the lower half of the cornea. It was white, and appeared œdematous. The upper half of the corneal space was occupied by the bulging vitreous, none of which, however escaped. The flap was replaced by a probe manipulated beneath the closed lid. Fomentations were employed. The flap became highly vascularized, and united without inflammatory

complications. Oatman attributed the eversion in this case to atrophy and shortening of the conjunctiva in the lower fornix, whereby downward traction was exerted upon a rather large flap. These conditions enabled a restless, blinking patient to displace the flap sufficiently for the upper lid to catch and evert it. Nov. 7, 1905, the patient returned to the hospital suffering from glaucoma in the aphakic eye. It was surmised that during the time the flap was everted corneal epithelium spread into the anterior chamber, where it continued to proliferate until glaucoma was produced. A broad, downward iridectomy was made.

The section of iris removed was examined microscopically. On its peripheral, anterior surface was a narrow zone covered with superimposed layers of epithelial cells closely resembling the stratified epithelium of the cornea.

Dr. J. H. CLAIBORNE read a paper entitled **a case of conjugate lateral deviation to the left.** The following is an abstract. The patient was thirty-seven years of age, and contracted syphilis five years previously. Had apparently recovered from all signs of it under treatment, but on October 25, 1905, he noticed something peculiar about the eyes. He said he did not see double, but the eyes seemed to him to have a "scum over them." He noticed that his left hand, forearm, and leg seemed numb. These symptoms rapidly passed away. On being questioned further concerning double vision, he said he saw singly, except occasionally.

Status, October 25, 1905.—The eye seemed to stare, but there was no lagging of the lids in downward movements. Both eyes were turned distinctly to the left. At times this was more marked than at others; the right eye looked farther in than the left eye looked out. Convergent power seemed normal. Could not be made to see double in any part of the field. Pupillary reflexes, fundi, fields of vision, and visual acuteness of each eye normal. Tactile sensibility normal. Grip of left hand slightly weak. Romberg's symptom absent, and there was no difficulty in orientation, although his walk suggested a slight ataxia. Left patellar reflex slightly increased; right, normal. He was put upon increasing doses of iodide of potash, but could take no more than fifty grains three times a day.

December 13, 1905.—The eyes seemed straighter, but when the left eye was moved to the median line the right eye seemed still to incline slightly inward. Fields better, but unable as yet

to carry his eyes beyond the median line to the right. Fingers of left hand seemed somewhat stiff and clumsy in his work.

It was quite obvious from the above facts that this was a case of conjugate lateral paralysis, the lateral movements to the right being paralyzed, and what was quite marked and distinct was that the paralysis of the external rectus of the right eye was more pronounced than the paralysis of the internal rectus of the left eye, which was entirely consistent with the recognized view that the centre of the right sixth nerve was the commanding one in lateral associated movements to the right.

These paralyses necessitated the existence of cross fibres passing from the centre for the external rectus of one eye to the centre for the internal rectus of the other. That it was not a true paralysis of the internal rectus muscle was clear from the fact that convergence was practically normal. Further, none of the fibres for true convergence was affected, but only those from the associated movements to the right. The situation of the cortical movement centre for associated lateral movements had not been definitely determined. It was of interest, he said, to study the probable position of the lesion in this case; the deviation was to the left, and it was a paralytic deviation.

It could not, therefore, be due to an irritative right cortical lesion. It might conceivably be a destructive lesion of the left cortex, for such a lesion would produce deviation to the left. It should be remembered, however, that there was a transient hemianæsthesia and hemiplegia that necessitated the existence of a lesion on the right side of the brain, and, since the deviation in this case was paralytic, it obviously could not be due to a destructive lesion of the right cortex.

We were, however, forced to the inevitable conclusion that the lesion was a destructive one, and that it was situated at the nucleus of the right sixth nerve. As to prognosis, Dr. Claiborne saw no reason why the case should not completely recover, but the improvement so far had been slight. It was unfortunate that the patient was unable to take more than fifty grains of iodide of potash three times a day.

In summing up, the following were the salient features of this case :

1. Conjugate lateral paralysis, with a deviation to the left.
2. Fugacious left hemianæsthesia and hemiplegia.

3. The location by exclusion of the situation of the lesion in the nucleus of the right sixth nerve.

4. Absence of hemianopsia.

5. The obvious predominance of the paralysis of the external rectus as opposed to that of the internal rectus.

6. Retention of normal convergence.

In the discussion of Dr. Claiborne's paper, Dr. LESZYNSKY agreed with Dr. Claiborne in the localization of the lesion, and thought Dr. Claiborne's reason therefor convincing. He would prefer to combine the injection of bichloride of mercury with the internal administration of iodide of potash.

Dr. TERRIBERRY thought that, while the patient would probably recover from his eye symptoms, the ultimate prognosis in regard to his becoming a strong man was exceedingly dubious.

Dr. H. KNAPP read a paper entitled, **on the etiology of lamellar (zonular) cataract.**

Published in the ARCHIVES of March–May, 1906.

On motion the meeting adjourned.

MONDAY, APRIL 16, 1906. PRESIDENT, DR. WILBUR B. MARPLE, IN THE CHAIR.

Dr. ALEXANDER DUANE presented a case of **excessive diffuse blepharoadenitis** in an otherwise healthy girl of fourteen. The condition had started fifteen months before as a series of styes culminating in a swelling which rapidly involved the whole lid. When the patient first came under observation about a month ago, the lid was enormously swollen and thickened, especially along the ciliary border, where the inflammatory exudate encased the lower edge of the tarsus. The tarsus itself, however, was evidently not affected and the palpebral conjunctiva was normal. The lower border of the lid which hung down so as to cover the eye almost completely was convex, reddened, and covered with crusts concealing several points of suppuration. Smears from these showed staphylococci only. Lid could not then be everted. Never painful nor tender. Cervical glands moderately, and pre-auricular gland markedly swollen. Hot applications and ichthyol ointment were used at home, and at each visit to the clinic all the crusts were removed and lashes epilated and a three per cent. yellow oxide ointment applied with con-

siderable friction. Under this treatment the swelling had gone down greatly, so that the lid could not be everted.

Dr. ALEXANDER DUANE also presented a **case of detachment of the retina with massive underlying exudate.**

The patient, a boy of fifteen, had discovered at the age of six that he could scarcely see anything with the right eye. Other eye normal. Had still perception of light, but recently vision had gradually failed till now it is absolutely nil. Was told one or two years ago at the Eye and Ear Infirmary that he had detachment of the retina. No history of any disease except measles, and careful physical examination shows that, apart from a few enlarged glands in the neck, there is no evidence of tuberculosis or any other serious disease. In the right eye, the pupillary vessels are engorged and tortuous. Below the disk and to the temporal side of it, is a rounded, more or less globular fixed detachment, extending 3 *mm* into the vitreous. Beneath this are masses of white exudate, which apparently contain new-formed vessels. (Appearances here strongly simulate those of neoplasm.) Near this detachment are one or two punctate hemorrhages. Near the disk are a few guttate, silvery splashes of exudate, like those of an albuminuric retinitis. These lie in the retina which here presents only a shadow detachment. Far below the disk is a large wavy detachment of the ordinary form. The diagnosis in this case seemed obscure. The conditions that naturally suggested themselves, viz., a neoplasm, a giant tubercle, or even a very extensive Bright's retinitis, seemed negatived by the long duration of the eye symptoms and the absence of any evidences, subjective or objective, of disease.

Dr. ARNOLD KNAPP presented a patient with **traumatic irideremia, broad adhesions of lens capsule to cornea, and glaucoma.**

The injury occurred in August, 1904, then resulted in a transverse scar of the cornea to which the lens capsule was adherent; the lens was absorbed. Vision $\frac{20}{30}$, F. n. On account of the glaucoma and beginning enlargement of the eye, the anterior adhesion of lens capsule had been twice divided with capsule scissors, but owing to the broad attachment the wounds in the capsule have always reunited and the glaucoma recurred. Dr. Knapp requested the opinion of the members present on what form of operation should now be done.

Dr. W. E. LAMBERT presented two cases: one of **epithelioma**

of the lid ; The other, **a plastic operation for restoration of the cul-de-sac.**

In the discussion which followed Dr. SCHAPRINGER suggested posterior sclerotomy in Dr. Knapp's case.

Dr. W. B. MARPLE presented **Leber's apparatus for transillumination of the eye.**

Having had a case of intraocular sarcoma recently, which offered some difficulties in diagnosis, he had ever since been especially interested in everything which would make the diagnosis of these intraocular growths surer. He had used the Sachs lamp, and considers the smaller Leber's instrument almost as efficient Mr. Swanzey had reported in the *Ophthalmic Review* for February, 1905, several cases in which he had made the positive diagnosis, in cases of detachment of the retina, of a neoplasm, and the resort to the aid of this instrument should always be made in cases of suspected intraocular growth. Unfortunately, it is only applicable in case the growth is in front of the equator, as it is difficult to transilluminate when it is farther back.

Dr. H. GIFFORD, of Omaha, Nebraska, read a paper entitled **a new eye-symptom in Graves's disease.**

The symptom referred to is a marked difficulty experienced in attempting to evert the upper lids of some patients with Graves's disease. This is especially marked in the earliest stage of the disease, and disappears later on. It does not depend upon the nervousness of the patients, for it is apparent when they are perfectly docile ; nor upon the exophthalmos, for it may be absent with marked exophthalmos, or present when the latter is hardly noticeable. It probably depends upon condition of hyperexcitability of the unstriated lid-levator of Mueller; the cause of this, as of the excessive lachrymation which sometimes accompanies it, probably being an abnormal excitation of part of the sympathetic. This symptom may occur without the co-existence of Dalrymple's sign, or may be absent when Dalrymple's sign is well-marked. Its chief importance depends upon the aid which it gives in the diagnosis of incipient or doubtful cases.

In the discussion of Dr. Gifford's paper, Dr. C. S. Bull stated that Dr. Gifford had been undoubtedly the first to notice this symptom. He had observed it three times in the last year, and considered it of great service in the diagnosis of slight and unilateral cases. He agreed with Dr. Gifford's explanation, and was satisfied that it was a symptom of the disease.

Dr. SCHAPRINGER stated that the nervous fibre running to Mueller's muscle had been accused before of being the cause of enophthalmos following traumatism. He had pointed out that the theory of enophthalmos after traumatism being due to hemorrhage into the orbit followed by cicatricial contraction of the organized exudate could not be true, for the motility of the eye might be unaffected in these cases.

Enophthalmos occurred after division or injury of the sympathetic nerve in the neck, with myosis, but in the orbit somewhere the fibres producing enophthalmos and those causing miosis separated. The enophthalmos following traumatism he had proven to be due to injury of the branch supplying Mueller's muscle.

Dr. GIFFORD had apparently discovered that irritation of this fibre would produce another symptom.

Dr. WOLFF thought the difficulty in everting the lid might be due to Dr. Gifford's explanation, but when cocaine was instilled which caused spasm of Mueller's muscle, was the lid thereby made more difficult to evert?

Dr. SCHAPRINGER stated that cocaine affected only the palpebral, not the orbital, portion of the muscle.

Dr. GIFFORD had never noticed that the lids were more difficult to evert after cocaine had been instilled, but he had referred entirely to the levator fibres in the orbital part of Mueller's muscle. The orbital portion caused exophthalmos in the lower animals, but was so poorly developed in man that it was perhaps doubtful whether its paralysis could produce enophthalmos.

Dr. H. MANNING FISH read a paper entitled, **on the frequency of blindness due to an affection of the accessory sinuses.**

The sudden appearance of an excruciating supraorbital neuralgia in a certain case of iridocyclitis (entirely free from pain for weeks), which could not be accounted for by any change in the inflammatory condition in the eye, led to the conclusion that a frontal sinusitis had caused not only the pain, but the iridocyclitis as well; the latter idea suggested by the frequency with which an accessory sinus involvement had been found by Dr. Fish to be the cause of a stasis in the ciliary body, as shown conclusively by the fact that on drainage of the affected cavity the accommodation range had been restored to normal. The hypothesis was then evolved that accessory sinus disease, in place of being an

exceedingly rare cause, was a very frequent cause of "idiopathic" ocular diseases that arise from a disturbance in the circulation, and it was determined to treat the cavities in succeeding cases, even though the external or intranasal evidences of sinusitis were entirely wanting. The results obtained surpassed all expectation. With but few exceptions (those who did not undergo treatment as recommended, or in the old cases showing no present intranasal pathological changes), a sinusitis was found to be the cause of some twenty different lesions: an affection of the extra-ocular muscles, peri- and retro-ocular œdema with protrusion, conjunctivitis, chemosis, herpes corneæ, superficial and deep abscess of the cornea, interstitial keratitis, hypopyon, enlarged and sluggish pupil, iritis, cyclitis, choroiditis, subretinal exudate, hemorrhagic neuroretinitis, intra- and retro-ocular optic neuritis, vitreous opacities, and glaucoma, all of which lesions were found in the literature, but always as isolated or very rare cases of the various reporters. The generally accepted theory that the ocular lesions are the result of a propagation by extension is questioned on the ground that it fails to account for the cases showing no involvement of the adjacent tissues. These lesions are accounted for by Dr. Fish's theory, that a pent-up secretion in the sinuses causes a periorbital circulatory disturbance through irritation of the sympathetic; a modification of Ziem's theory of a passive orbital hyperæmia, due to under-oxygenization of the blood from a nasal stenosis.

The claim that sinusitis is the most frequent cause of "idiopathic" or obscure ocular disease is supported by the evidence of every examination made on the cadaver as to the condition of the accessory sinuses—over 40 per cent. showed an increase of one or more of the cavities at the autopsy; by the report of Senn, the only man who examined the nostrils in every case of uveitis or iridocyclitis, who found a visible intranasal pathological condition in fourteen out of twenty-one cases; also by the report of Mendel, who found four out of seven successive cases of an involvement of the optic nerve to be due to accessory sinus diseases—the only man who looked for sinusitis in every case of optic neuritis. Of twelve successive personal cases of an affection of the optic nerve, eight were traced to sinusitis. Investigation as to the pathogenesis of corneal ulcer has hitherto been limited to a determining of the route of invasion of the guilty micro-organism, by the fingers or via the lachrymal apparatus

when a purulent secretion was present in the nostril; but the micro-organisms usually found in corneal ulcer are harmless under normal conditions; some circulatory disturbance is requisite to render the cornea subject to infection. In fevers and infectious diseases: typhoid, pneumonia, influenza, measles, erysipelas, scarlatina, typhus, cerebro-spinal meningitis, etc., the accessory sinuses are especially prone to be primarily affected; the ocular lesions following these various diseases, especially those appearing during convalescence, are similar to those found by Dr. Fish to be due to sinusitis. This theory affords the best explanation of their pathogenesis. The diagnosis of optic neuritis, due to anæmia or chlorosis, is arrived at by exclusion, without a thought as to sinusitis, which is accountable for more reported cases of optic neuritis than those due to anæmia or chlorosis.

Glaucoma, considered by various authorities to be due to a disturbed circulation or an irritation of the cervical sympathetic, can result from an irritation of the sympathetic, due to sinusitis. The reporter holds accessory sinus disease to be a very frequent cause of the various ocular diseases, hence of blindness.

Dr. GIFFORD felt quite certain that more attention should be paid to the accessory sinuses. Many cases of headache were not due to the little astigmatism which was present, but could be cured by treatment of the nose.

Dr. ALEXANDER DUANE stated that in cases of pronounced asthenopia, and in headache of the migraine type, the origin of the trouble could frequently be traced to the nose. An hypertrophy of the middle turbinate was often associated with a marked convergence insufficiency.

Dr. WOODWARD related the case of a patient who had premonitory symptoms of glaucoma, recurring, and also right supraorbital neuralgia. He opened the right frontal sinus, in which he found granulation tissue. He removed the lining of the sinus and drained into the nose, and also curetted the antrum of Highmore. The patient has never had any symptoms of glaucoma or supraorbital neuralgia since.

Dr. LINN EMERSON had seen eye symptoms follow sinusitis, and he always examined for nasal trouble in cases of asthenopia.

Dr. MEIERHOF believed that there was no question that the etiology in many cases of eye disease needed clearing up,

especially the optic-nerve affections occurring at puberty, and that possibly some of these obscure cases would be found associated with sinus disease.

MONDAY, MAY 21, 1906. PRESIDENT, DR. WILBUR B. MARPLE, IN THE CHAIR.

Dr. CARL KOLLER presented a patient with gunpowder burns of both eyes, followed two weeks after the injury by complete circular ulcers of the corneo-scleral margin with undermined edges. The ulceration spread centrally, with retraction of the undermined flaps, until only small central disks of cloudy but intact corneal tissue remained. The process was finally arrested after cutting off the undermined edges. In healing, the retracted corneal disks became larger, stretched by the cicatricial tissue, and vision improved to 6/60 in the right eye and the counting of fingers at two feet in the left.

Dr. JOHNSON asked whether the trimming of the edges of the ulcer had caused the healing to take place.

Dr. KOLLER stated that although healing had taken place after the edges had been trimmed, he did not think that the healing was caused by the trimming.

Dr. DAVID WEBSTER presented a **case of cataract caused by vibratory massage, intensified by application of electricity through fluid.**

The patient was fifty-three years of age, a miner by occupation. He had three severe attacks of iritis in his left eye and several mild attacks. The first attack was in 1884. Dr. Webster first saw him in 1896. The patient still has vision of 20/20 in the left eye. In 1900, the attacks of iritis were shifted to the right eye, and in 1901 he had a second severe attack of the right eye and three attacks in 1902, followed by slight optic neuritis and some thin opacities of the vitreous. In March, 1902, after an absence of about six weeks, he returned with exclusion of the right pupil, "bombé" iris, and "crater" pupil. The iris had not begun to bulge when the eye was examined in Chicago a few days previously. Dr. Webster performed an iridectomy upward. After a week the patient was discharged with the eye white. He was next seen in April, 1906; the vision of the right eye was 2/200; he had a cataract in this eye which had first become visible about a week previously. He had used electrical vibratory mas-

sage on the eye three times. Each time the patient stated that it darkened the eye, but the vision cleared up the first two times. It took a week or more to clear up completely. He had used, about ten days after the vibratory treatment, three or four times, an application of electricity through a solution of iodide of potassium, 20 minims of the saturated solution to about 1½ oz. of water. This solution was kept in contact with the eye by means of an eye cup of his own contrivance, and an electrical current taken from an ordinary incandescent light passed through it and the eye for about four or five minutes at a time. The positive pole was in the solution and the negative on the back of the neck. In May, 1906, the cataract was ripe; good field of perception. Ever since the last attack of iritis the patient had noticed a large floating body attached to the temporal side of the fundus, floating like scum on the surface of water, weblike, and thickened in two places near its attachment. The web is over the pupil when the eye is at rest.

Dr. CARL KOLLER had read of cataract being produced in rabbits by the vibration of tuning-forks.

Dr. WILBUR B. MARPLE mentioned a case with peripheral opacities of the lens which had developed cataract in both eyes by the vibrations produced by a powerful vibratory apparatus. One lens was much swollen and the other partly dislocated.

Dr. E. B. COBURN stated that probably not more than 10 to 15 milliamperes could have passed through the eye.

Dr. J. H. CLAIBORNE had seen cups which produced a vacuum, making and breaking connection, cause conjunctival hemorrhage and swelling of the lids, but no change in the lens or retina.

Dr. T. R. POOLEY presented a case of **epithelioma of the eyelid and globe,** which was especially interesting because he could give the result obtained by X-ray treatment, extending over a period of nearly three years. The patient was a woman of seventy years who consulted Dr. W. J. Morton, April 3, 1903. There was no family history of cancer. Twenty years ago the disease began as a pimple on the side of the nose, which extended to the eyelid. Two and a half years before, growth was removed, but returned in two months. Three months before going to Dr. Morton, she saw Dr. Wilson, of Bridgeport, who sent her to Dr. Morton for X-ray treatment. At this time the case was considered inoperable as the ulcer involved the entire lid, the eyeball, and orbit. She was treated from this time on by X-ray three times a week until July

29, when the ulceration and induration of the lower lid were entirely gone and the skin was soft and flexible like natural skin, and the case was discharged as cured. In Dr. Morton's notes the condition of the eyeball at this time is not noted.

In May, 1905 (seven months), she returned with a recurrence which she first noticed six months ago. The ulceration had rapidly progressed, destroyed about half of the upper eyelid, and extended into the orbit. X-ray and radium treatment again resorted to, with good result so far as the lids were concerned, but the eye was lost. At this time Dr. Pooley was consulted, October 24. The lids were apparently healed, but there were phthisis bulbi, nodular infiltration of the cornea, and evident invasion of the orbit. The lids were sunken in and adherent to the shrunken globe, especially the lower lid. Enucleation was advised. Done on November 13th. Operation difficult because of the adhesions of the globe; the vitreous was lost by cutting the sclera ; all the suspicious tissue on the nasal side of orbit removed as well. The result was rapid healing with complete closure of the palpebral fissure. Since then she has had a continuance of the X-ray treatment until quite recently. There now seems to be no evidence of the return of the growth.

Dr. POOLEY stated the principal point of interest from a clinical standpoint to be: the occurrence of a relapse severe and extensive in character after a seven months' discontinuance of treatment. He thought that the case showed the necessity for careful observation for a long time even after apparent cure to prevent relapse, and that, if the size and situation of the growth permitted, he would place more confidence against recurrence in a surgical procedure, entire removal of diseased parts, and a plastic operation to cover the defect, than X-ray or radium treatment.

Another point was that the pathological examination of the eye showed that this treatment, while it caused the disappearance of the superficial part of ulcer, did not favorably affect its development in the eyeball.

Dr. E. B. COBURN demonstrated the pathological examination of the eye treated by X-rays by Dr. T. R. Pooley.

The eye was completely collapsed when received, and the vitreous had escaped. The eye was prepared for examination in the usual way, and the microscope revealed the following conditions: the conjunctiva, the greater part of the cornea, and the

tendons of the external ocular muscles were invaded by a new growth of the type usually characterized as epithelioma.

At no point had the tumor made any appreciable invasion into the sclera from the muscular attachments, but the growth from the conjunctiva had penetrated into the ciliary body at one part, having followed evidently the path of one of the anterior ciliary arteries. The ciliary body was, however, slightly involved. At some period there had been a perforating ulcer of the cornea with incarceration of the iris. This had healed, but the new growth had extended into the scar tissue and into the iris. The lens was only apparent by the remains of the capsule.

The choroid and retina were detached, and with the ciliary body presented the usual appearance of such structures in phthisical eyes.

There was considerable infiltration of the conjunctiva and cornea with round cells, but whether these were caused by the raying, or were an indication of the inflammatory type of the new growth, it is impossible to say. Other than this the only indication of the effect of the X-ray treatment was an occasional vacuolization of the superficial epithelium.

Dr. W. E. LAMBERT had seen two cases in which epithelioma of the lid had been removed and then recurred. Dr. G. S. Dixon had employed the X-ray in these cases with results that had been satisfactory so far.

Dr. DIXON stated that in the first of the cases referred to by Dr. Lambert a small nodule remained well up in the orbit, which had been subjected to three treatments with medium tubes at nine inches. In three weeks the small nodule began to disappear, and is now about gone. The second was an extensive epithelioma of the lower lid, which was in process of breaking down. The ulcer healed in the centre, but the nodules were left at the ends of the periphery of the growth. The nodules were broken down with forceps, and then under the X-ray healing of the broken-down nodules took place. Experience with deep-seated tumors of the epitheliomatous character was not very satisfactory. Recurrence was almost certain, but the X-ray could always relieve the pain very greatly.

Dr. E. L. OATMAN had seen two cases that had been treated by the X-ray and pronounced cured. Recurrence took place, and a plastic operation was performed. He believed that recurrence was the rule.

Dr. J. H. CLAIBORNE had seen X-ray tried for two months after recurrence following plastic operation. He believed it to be good for superficial ulcers, but not for deep tumors.

Dr. E. B. COBURN thought that we had little to hope for in X-ray, and it seemed to be generally falling into disuse.

Dr. E. GRUENING reported a case of **zonular cataract in which he had extracted a perinuclear zone.**

The patient came to Mt. Sinai Hospital in October, 1905, with zonular cataract in both eyes. Visual acuity, 10/200 in each eye, although she could read moderately large print when her pupils were dilated. The right eye had divergent squint about 40°. The extraction was done on the squinting eye. An incision of about 7*mm* was made at the sclero-corneal margin; with a Graefe cystotome the capsule and the clear layer of lens were cut. With slight pressure the perinuclear zone could be removed, and some clear lens substance evacuated. The iris was not excised. The remaining cortex was absorbed in about two months. The discission of the secondary cataract was practised later. The patient now has a central circular perfectly black pupil, with correcting lens; vision equals 20/20. The eye was straightened by a tenotomy and advancement.

Dr. CARL KOLLER stated that it certainly was very interesting that the lens in this case should have split into layers, the opaque zone coming out and the clear zone remaining.

Mr. DAVID WEBSTER thought that the clear zone might also have been evacuated at the time of the operation.

Dr. E. S. THOMSON had had the experience of seeing the entire perinuclear zone go into the anterior chamber after needling.

Dr. W. E. LAMBERT presented two cases of **foreign body in the globe,** and also a case of **high myopia with extraction of the lens.**

The first case, a male, sixty-eight years of age, residing in Troy, N. Y., was hammering a piece of steel on April 28th. A piece flew off and struck him in the eye. He was admitted to the Infirmary on May 1st. There was a small wound in the cornea, on the temporal side, right eye. Also a small opening in the iris. Lens cataractous. Skiagraph showed presence of a foreign body, size estimated 2 × 1*mm;* located as being 22–25*mm* back of the centre of the cornea ; 5*mm* below horizontal plane ; 4.75*mm* to nasal side of vertical plane. The eye was cocainized, and

placed before the large magnet. The body was drawn into the anterior chamber just behind the iris. A small iridectomy was then made upwards, and the steel withdrawn with the Hirschberg magnet. The patient made an uninterrupted recovery, and was sent home. He has subsequently returned, and the cataract, which was a senile one, was removed. It is a little early yet to test his vision, but he should, in all reasonable probability, have excellent vision.

The second case, a male, aged thirty-six years, was struck in the left eye on May 1st by a piece of steel which he was hammering. He was sent to the infirmary on the same day. A small opening was seen near the corneo-scleral junction, a little below the horizontal meridian, temporal side. The skiagraph showed the presence of a large foreign body, size apparently $2 \times 4mm$, and the shadow suggesting that the foreign body was irregular. Located $9.75mm$ back of the cornea; $8mm$ below the horizontal plane; and $5mm$ to the nasal side of the vertical plane. The eye was cocainized, the original opening enlarged, and iridectomy was made, and with a Haab magnet the piece of steel was withdrawn. There was a considerable hemorrhage into the anterior chamber, and a slight prolapse of the ciliary body into the wound. The patient was put on hot bathing, atropin, and argyrol. The eye gradually quieted down; the hemorrhage absorbed; and on the tenth day the man left the hospital at his request, contrary to advice.

The third case was that of extraction of lens in high myopia. Female, aged sixteen years, vision O. D. = 5/200; O. S. = 15/200. Under a mydriatic, skiascopy showed a myopia of 22 dioptres, with a small amount of astigmatism in the right eye, and 19 dioptres in the left eye. Vision: right eye, 20/70 with − 20; left eye, 20/70 with − 18.

She had been wearing for ten years glasses O. D. − 15; and O. S. − 13. Suffering a great deal of discomfort, however, with the glasses, and her vision with them not being satisfactory, she consented to have an operation. On May 3d, under cocaine, the lens in right eye was needled. May 4th, some slight reaction. May 5th, complained of severe pain. Tension, + 2. Lens very much swollen and opaque. Under cocaine, incision was made with lance-shaped knife into the clear cornea, all soft lens matter extracted, anterior chamber irrigated freely with normal salt solution.

The following day the anterior chamber was restored, eye quieted, tension normal, and no pain. Patient was kept in the hospital until the 15th, by which time all the remaining soft lens matter had been absorbed. An incision of the capsule was made with Knapp's knife needle a week later, clear black pupil being obtained as the result. The patient now has a vision of 20/30 with a + 1 spherical combined with a + 1 axis 90.

Dr. W. B. MARPLE presented a case of **plastic operation for restoration of the cul-de-sac.**

He had operated upon the patient for formation of a cul-de-sac three weeks ago. The lad had lost his eye by the burn of a sky-rocket, and the culs-de-sac, both upper and lower, were entirely obliterated, and the lids were adherent together. He had found nothing but scar tissue in the orbit. He had employed the technique suggested by Dr. Weeks, except that, after he had stitched the Wolff graft into position with three stitches, he had also passed a thread with a needle at each end through a hole near the upper edge of the rubber plate, and then brought these needles out on the brow, after passing them through the graft and through the fascia at the orbital margin. These threads were then tied firmly over a pledget of gauze, and served to hold the plate and also the graft firmly up against the orbital ridge. This seems to be a decided advantage. The graft took *in toto* (he had only attempted to restore the upper cul-de-sac at this operation) and there was a very deep upper cul-de-sac, as deep as is usual after enucleation of an eye.

Dr. C. W. CUTLER reported a case of **uveitis with hyperpyrexia in which large doses of salicylate had been used.**

The patient, aged twenty-seven years, a Hebrew, well-nourished, of good habits; no recent illness, and no history of venereal disease.

About November 20, 1905, he noticed that right eye was blurred. Ten days later there was slight scleral injection, not limited to the ciliary region, a few large spots on Descemet's membrane, and some grayish exudate along the vessels at upper edge of optic nerve. V. O. D. = 20/40. O. S. = 20/30 +. Given K. I. in increasing doses.

December 10th.—O. D.: Cornea dull, aqueous cloudy, pupil dilated with atropin. Vitreous filled with opacities. Vessels seen only above nerve. O. S.: A few large dots on Descemet's membrane. Vitreous hazy, feathery gray exudate over vessels above

the nerve. Veins much dilated, nerve red, not swollen. V. O. D. fingers three ft. O. S. 20/30. Given sod. salicyl. gr. xx., q. 2 h. The first dose at 6 P. M., December 10th, and during the next eighteen hours he received 4 drachms.

Urine: sp. gr. 1.022, large sediment of urates, no albumin, no sugar, excess of indican. There was profuse perspiration during the night.

December 11th.—The temperature rose, as shown by the chart, until it reached 108.5° rectal. Salicylates stopped. Phenacetin gr. x. and ice-alcohol sponge given for two hours, after which the temperature fell quite rapidly. The pulse was about 200. The patient was in a stupor, and there was involuntary urination. There was a small, red, macular rash on chest and back and some on the face, arms, and legs. Meningitis was feared, but there was no refraction or stiffness of neck. The rectum was irrigated q. 3 h., and much undigested food, mucus, and gas returned.

December 12th.—Mental condition improved. Drowsy, rash fading. Temperature, 99° to 100°. Given salol gr. v., q. 4 h. During the night the temperature rose to 101°, and there was some delirium, with delusions of flying and moving objects in the room and noises in the house. Salol stopped and bromide given, but was wakeful for forty-eight hours; then slept, and mind became clear and temperature normal.

The vitreous opacities cleared slowly, so that fundus could be seen in both eyes. There was much soft-edged, gray exudate covering the vessels in places, and the retina in general seemed swollen and nerves red.

January 3d.—As the eyes improved slowly, salicylic acid and sod. bicarb. āā gr. x. were given t. i. d., care being taken to order that derived from the oil of wintergreen. The sodium salicylates previously used had been Merck's Synthetic. On the following day, January 4th, temperature by mouth 100°, after that it became normal and remained so. The medicine was continued for ten days.

January 14th.—V. O. D. = 20/20. O. S. = 20/30. Media clear, retina normal, except for a slight appearance of œdema in places.

This case is singular in its acute course, its association with high temperature, and its short duration. The prodromal stage, if I may call it so, lasted nearly three weeks, beginning, as do

most of the cases of uveitis, without constitutional symptoms and apparently without fever.

The patient was about his work until the second eye became affected. At this point there seemed to be a fresh and more virulent invasion or exacerbation which yielded promptly to treatment, and the eyes gradually returned to the normal.

Are these relatively mild infections due to pyogenic organisms which have lost their virulence, or to non-pyogenic organisms, such as those supposed to cause rheumatic fever or influenza, or to toxines? Either is possible.

Lenhartz states that in general sepsis, many of the so-called "bland infarcts" in the capillaries of the brain and kidneys are filled with streptococci and staphylococci, although the tissues appear normal.

Goh described a mild case of pneumococcus infection with small infiltrations and a retinal hemorrhage. In a number of cases no organisms have been found, and the vessels were free from infectious material. The toxines, of course, elude observation, so it is useless to theorize as to the precise etiology of the uveitis. In several cases of acute uveitis, in which Dr. Cutler has had the blood examined, there has been no leucocytosis. Indican has been present, and in several cases there has been a little albumen in the urine. It is to be classed in general as a manifestation of sepsis arising from some focus which may not be discovered.

Another class of subacute or chronic uveitis resembles the cases of subacute nephritis, which indicate the presence of an irritant material in the blood. It is not necessary to assume that the nose and the neighboring sinuses are the sources of infection because of their proximity, and in my experience the association is infrequent.

In this case the hyperpyrexia and the prompt response to salicylate suggest a rheumatic affection. Dr. Cutler has seen several cases, one with acute tonsillitis, and uveitis of the same nature apparently as the present case, though less virulent, which yielded in the same way, but in most cases of chronic uveitis the salicylates seem to be of little value. It is interesting to note that cases are on record in which salicylic compounds have caused a rise in temperature.

Lewin (*Die Nebenwirkungen der Arzneimittel*, p. 503) describes this paradoxic elevation as generally beginning with a chill and

lacking the usual sweating. As in this case there was no chill and sweating was profuse, the drug had probably no influence in causing the fever. The problems of uveitis are most interesting, and since we can, as a rule, approach the disease only clinically, it is important that the different types should be carefully noted and reported until a wider knowledge may permit their definite classification. Especially is it important to consider all cases of uveitis as part of a general constitutional condition.

Dr. E. L. MEIERHOF thought that the rise in temperature had been due to the large doses of salicylate.

Dr. E. S. THOMSON presented a case of **keratoconus, operated on by removal of the apex of the cone.**

The patient, a man aged twenty-eight years, came to the hospital two months ago complaining of failing vision. The right eye had very well-marked keratoconus, with vision of fingers at one foot. The left eye had also keratoconus, with vision 20/200. He was admitted to the hospital one week later and the right eye operated upon.

Two needles threaded with fine catgut were carried through the cone, and then a piece of the catgut, about 4*mm* in diameter, was excised by transfixion with a Graefe knife, completing the section with scissors. The sutures were left in for a week, and though the anterior chamber was well restored, when the sutures were removed the wound was found to be only slightly adherent and reopened for half its extent. Under treatment, however, it healed in the course of a week, and he now has vision of 20/200 in the eye, with a small cicatrix 3*mm* in diameter below the centre of the cornea. The cicatrix is still growing smaller.

Dr. H. W. WOOTTON presented a case of **vernal catarrh.** The conjunctivæ of both upper lids were covered with characteristic flat-topped granulations resembling paving stones set close to one another. The surface of the granulation was pale, and there was some secretion. The lower lids were not affected, and there were no circumcorneal swellings. The patient had first noticed his trouble in the early spring and the symptoms have been getting progressively worse as the hot weather advanced. There was considerable lachrymation and some photophobia.

Dr. E. L. OATMAN had removed some of the granulations, and the following is his report of their microscopic examination:

Pathological Examination.—The specimens consist of loosely

arranged, thick bands of fibrous connective tissue and connective-tissue cells of varied forms. The relative proportion of fibrous tissue to cells varies in the different specimens. The surfaces of the growths are covered with irregularly thickened layers of epithelium, which is proliferating inwards in the form of long digitations. Some growths are very vascular, others contain a few blood-vessels. The most marked feature is infiltration of the tissues with eosinophile leucocytes. They are found everywhere, but are most numerous just below the surface epithelium. Eosinophile infiltration of the tissues serves to distinguish this disease. They pass out through the walls of the blood-vessels, travel in the lymph spaces to the surface, and escape by squeezing themselves through the interspaces of the epithelium. Vesicular spaces exist in the superficial layers of the epithelium. Dr. Oatman was unable to trace any connection between the eosinophiles and spaces. Eosinophiles are found in great numbers in the secretion from eyes affected with these growths.

REPORT OF THE PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. C. DEVEREUX MARSHALL.

THURSDAY, MAY 3, 1906. PRIESTLEY SMITH, F. R. C. S., PRESIDENT, IN THE CHAIR.

Mr. MacKenzie Davidson read a paper on **radium in the treatment of rodent ulcer.**

He gave a short description of radium and its source and then gave details of how he applied it, and the results he had obtained in the somewhat large number of cases which he had had under his care.

As a rule he found it unnecessary to apply the radium very frequently. In many cases cure had been effected with one or two applications with several weeks' interval between the applications. In other cases more frequent application was necessary.

The radial activity of different specimens of radium varied, but it was possible by means of an electroscope to measure this. He preferred to use it when encased in a sealed glass tube, for the glass shut off some of the harmful rays which would burn the skin, and which were of no use for destroying the rodent cells. The power of radium was for practical purposes a fixed quantity in any one specimen, so that the dose given was an absolutely known quantity ; in this way it differed considerably from the X-rays which were not constant, but depended upon a variety of circumstances.

Mr. Ransom Pickard (Exeter) described a case of **implantation cyst containing wood fibres.**

The patient was a girl aged fourteen, and the tumor had been noticed for nine years. It was *3mm* in diameter, and was situated below the pupil. The growth was removed, and its base was found to be composed of granulation tissue containing three wood fibres

of coniferous origin. The tumor consisted of epithelial cells, and contained several cysts, some of which were formed by degeneration of the cells, and others by the formation of fissures. There was no history of injury to the eye, the cornea was quite normal, but in all probability the cornea had become perforated ten years ago by a fine splinter, for at that time she fell and struck her nose against a table.

Messrs. TREACHER COLLINS and JOHNSON TAYLOR (Norwich) described a case in which there was a cystic swelling occupying the position of the left eye, and apparently mainly formed by a bulging forward of the conjunctiva of the upper lid. It was present at birth and had steadily increased since.

Mr. Johnson Taylor first saw the child when three weeks old. He then tapped the cyst with a fine trochar and canula; it refilled the following day. When next seen about a year later, it had increased considerably in size in all dimensions; it stood out 2½ inches from the orbital rim and gave a most unsightly appearance. Blood and discharge had also been exuding from it for two months.

Under a general anæsthetic Mr. Johnson Taylor removed it entirely and handed it over to Mr. Treacher Collins for examination.

The examination showed that the cyst was due to an enormous distention of the whole globe, the sclerotic forming its outer wall. The inner coat corresponded to the retina, but in no place did that portion derived from the secondary optic vesicle lie in contact with that developed from the outer layer. The anterior portion of the cyst was lined by the former, and the posterior part by the latter. The cavity of the cyst was composed of a space between these two layers, the cavity of the primary optic vesicle.

The explanation of the formation of the cyst was apparently the imperfect involution of the primary optic vesicle which forms the secondary optic vesicle. There had been some attempt at involution both anteriorly and below. Anteriorly the inner wall of the cyst was prolonged backwards in a fold at the bottom of which was a rudimentary lens, so that at one stage there must have been some downgrowth of surface epiblast. Below was a mass of atypically developed vitreous, and the expansion of the cyst below must have been checked by this upgrowth of mesoblast, hence the chief distention upwards into the upper eyelid.

As the whole of that portion of the retina which normally forms the inner layers was in the anterior part of the cyst, it is not surprising that no optic nerve was developed. The lens showed a defect in its posterior capsule, and through this gap mesoblastic tissue had extended forwards and become mixed with the lens fibres. A nodule of hyaline cartilage was found in the sclerotic at the posterior part of the specimen.

THURSDAY, JUNE 14, 1906. PRIESTLEY SMITH, F.R.C.S., PRESIDENT, IN THE CHAIR.

Mr. NETTLESHIP and Mr. MENTEITH OGILVIE gave an account with diagrams and drawings of a family, in which twenty persons in four generations had a peculiar variety of partial congenital stationary cataract in the form of a perfectly circular, well defined, homogeneous or finely granular layer, of no great density, situated between nucleus and posterior pole, about 4*mm* in size. At first sight it might be taken for a small lamellar cataract, but the invariable absence of any trace of a second layer and the certainty that the opacity lay behind the nucleus negatived that diagnosis, whilst there was equally good evidence that it lay in front of the posterior pole.

Some of the cases were first seen by Mr. Doyne, at Oxford, several years ago. These were re-examined by Mr. Ogilvie and were found to be unaltered, and he has recently discovered a large number of new cases. The change caused but little loss of visual acuteness, and only a slight desire to shade the eyes against bright light ; hence the number of cases could only be determined by ophthalmoscopic examination of every accessible member of the family. Mr. Ogilvie examined about 150 persons, whilst one group, living at Edinburgh, was examined for the writers by Mr. G. Mackay. All the cases occurred in one branch of the family tree.

Mr. SIMEON SNELL (Sheffield) read a paper on **steel alloys which are not magnetic.** He mentioned that during recent years, steel alloys had been used in certain industries, and that these alloys had altogether different magnetic properties to ordinary iron or steel. Manganese steel, which contained 12 % of manganese, 87 % of iron, and 1 % of carbon, formed a very hard steel which was difficult to machines, but the point of interest was that it was non-magnetic. Its toughness made it useful for many purposes.

Nickel and iron was another alloy, and this was as susceptible to magnetism as pure iron, but the admixture of a small percentage of manganese and carbon completely altered the magnetic properties. Thus a mixture of carbon 0.4%, nickel 20%, and manganese .9% with iron was absolutely non-magnetic. Another point was that if this same alloy were quenched in liquid air it became magnetic.

Another alloy was chromium steel. It was magnetic, but less so than ordinary steel. Specimens of these were exhibited, and their magnetic peculiarities were demonstrated.

Mr. Snell remarked that fortunately the vast bulk of all steel splinters penetrating an eyeball came from steel which was magnetic, and therefore the use of the electro-magnet was unaffected. The possibility of steel being non-magnetic should be borne in mind, and enquiries made as to the particular kind of steel from which the fragment injuring the eye became detached.

In conclusion Mr. Snell referred to other alloys which were highly magnetic. He had not, however, yet found that they were more magnetic than the soft iron in use had been.

Messrs. L. V. CARGILL and S. MAYOU described a case of **miliary tuberculosis** in an adult in which there was tubercle of the choroid with implication of one optic disk. The patient was a man aged twenty-one who was admitted into King's College Hospital in December, 1905. Although previously healthy, he had been feeling unwell for six weeks, and was supposed to be suffering from influenza. He perspired a good deal, was feverish, and was losing weight. There were no physical signs in the lungs, and no tubercle was found in the expectoration or blood. Opsonic index to tubercle was 1. Two weeks later an irregular yellowish white patch was found in the right eye near the disk; it was only slightly elevated and there was no pigment. In the left eye there were signs of optic neuritis. The irregular pyrexia continued, and signs developed in the lungs. On February 17th, tubercle bacilli were first found in the sputum, and death occurred three days later. The post-mortem showed that the meninges were studded with tubercle, so also were the lungs and most of the abdominal viscera. The sections of the eye showed a typical tuberculous mass situated at the edge of the choroid on the outer side of the optic nerve; this mass involved the nerve, and spread backwards through the lamina cribrosa. The anterior part of the globe was normal except for a congenital anterior synechia.

FRIDAY, JULY 13, 1906. PRIESTLEY SMITH, F.R.C.S., PRESIDENT IN THE CHAIR.

Mr. A. R. BRAILEY read a paper on **congenital distichiasis,** and gave a clinical description of a case, together with the result obtained by making a microscopical examination of a small portion of the lid. The chief point of interest was the fact that the Meibomian glands were apparently completely absent, and their place was taken by hair follicles. He then gave a description of four other cases seen in the clinic of Professor Fuchs in Vienna. These were the only cases seen there during a period of twenty years, and showed how rare this deformity was. He also described a case reported by Kuhnt.

He drew attention to the distinction which should be recognized between trichiasis and distichiasis, and urged the advisability of limiting the latter term to the congenital cases. He gave a list of other cases which had been reported.

Dr. C. H. USHER (Aberdeen) read a note on the **choroid at the macular region.** He drew attention to the fact that in sections of the eyes of albinos examined by Mr. Nettleship, and shown at a meeting of the Society in November last, the pigment was present in the choroid, but limited to the yellow-spot region.

He had since examined eleven normally pigmented eyes, and had found (1) a deeper pigmentation of the retinal epithelium at the yellow-spot region, and an increased thickness of this layer; (2) a marked increase of the pigmentation of the choroid; and (3) an increase in the thickness of the choroid.

From the above observations it might be expected that if pigment were present at all in an albino's eye, it would be found in the macular region.

Dr. USHER also read a paper on a case of **unilateral white eyelashes and tufts of hair.** The patient was a girl, aged three years, whose eyelashes on the left side were quite white, and she also had two tufts of white hair on the left side of her head. There was nothing else abnormal in the mother or child, and the pregnancy was normal in every way. The condition was first noticed about the third day after birth. All the eyelashes on the right side were light brown in color, so also was the greater part of the hair of the head. The family history was carefully investigated, and although there were some albinos in the family, yet no other member seems to have had this peculiar condition.

XIII.—**Serumtherapie bei infectiösen Augenerkrankungen.** (Serum Therapy in Infectious Eye Diseases.) By Prof. THEODORE AXENFELD, Freiburg. Monograph, p. 89. U. Hochreuther, Freiburg i. B., 1906.

The reasonable sequence of the discovery of bacteria is to be found in etiological therapy and prophylaxis. The advances in immunity and specific serum therapy have resulted in the application of specific sera also in ophthalmology against certain infections occurring in the eye. This monograph in the author's characteristic painstaking manner reviews most instructively the present status of serum therapy in eye diseases.

Serum therapy against diphtheritic infection. The results of serum therapy against infection of the eye with diphtheria bacilli have been most successful. This chapter commences with general clinical and bacterial data on diphtheritic conjunctivitis. On page 11 it is stated that animal inoculations are necessary to differentiate the virulent from the non-virulent (xerosis) diphtheria bacilli, which as is well known are constant inhabitants of the conjunctiva. (This differentiation can, however, be made in a much simpler way by means of fermentation tests.[1]—*Reviewer.*) The favorable influence exerted by the serum injections does not hold good for previously existing corneal infiltration. Though the conjunctival process is arrested, the corneal process may go on to destruction of the cornea, presumably because this ulceration is usually due to a secondary infection with pyogenic organisms. Though cases of diphtheritic infection may run a very mild course, it should be stated, as a rule, that in all cases of pseudo-membranous conjunctivitis with Loeffler's diphtheria

[1] "The Differentiation of Bacillus Diphtheriæ, Bacillus Xerosis, and Bacillus Pseudodiphtheriæ, by Fermentation Tests in the Serum-Water Media of Hiss." ARNOLD KNAPP, M. D. *Jour. of Medical Research*, vol. xii., No. 4, 1904.

bacilli, serum should be at once injected. The serum is best applied subcutaneously. Finally recent investigations at the Freiburg clinic are reported which show that the xerosis bacillus has no etiologic significance for chalazia, and that the non-identity of this organism with the virulent diphtheria bacillus is further shown as diphtheria antitoxin has no effect on lesions where the pseudo-diphtheria bacillus has been found present.

Serum therapy against pneumococcic infection of the eye. The most important pneumococcus infection in the eye is the serpent ulcer of the cornea (hypopyon keratitis), though the typical clinical picture is exceptionally produced by other organisms. The treatment of this condition with serum is entirely due to Roemer's excellent work. The difficulties of a successful immune serum against pneumococci in general were of course also present in its application in ophthalmology. Roemer endeavored to overcome these difficulties by using a polyvalent serum (a mixture of sera from animals immunized by various strains); he then experimented with an "anti-aggressin"[1] serum.

Passive immunity (sera of immunized animals) was first tried. This seemed of greatest value prophylactically; its success in active ulcers of the cornea was much less. Active immunization (dead cultures) was also followed with some success; but the combination proved to be the most potent; 175 cases of serpent ulcer of the cornea are carefully tabulated. The results are not decisive; further experiments are necessary. In the application of this combined method the injection of culture (intramuscular) and of serum (subcutaneous) must occur at the same time.

Post-operative pneumococcus infection would furnish a field for successful serum therapy. Prophylactic serum injection has been practised by Axenfeld in cases where from infected conjunctiva, difficulty of operation, or poor physical state of patient, subsequent infection seemed liable. This question also demands further investigation. After access of suppuration the serum injection had no effect.

In conclusion the author states the Roemer's serum unquestionably exerts a curative action in many cases; prophylactically

[1] Bail (quoted on page 36) found that filtered peritoneal exudates when injected into a second animal caused at first increased susceptibility to typhoid infection ("aggressin"), later an immunity against this infection greater than that obtained by the other methods, the so-called bactericidal immunization. Wassermann has reported that this effect can be obtained directly from the bacteria by autolysis.

it is especially to be recommended. When the disease is well-marked, serum therapy should alone be relied upon only at the very onset. If the condition progresses or in advanced cases, the older methods, galvano-cautery or the Saemisch section, must be resorted to. Its use is therefore at present very limited. In any case the work which has been done along these lines is most creditable. The field of application will be enlarged as soon as a more uniform and a more active serum is obtained.

Serum therapy against streptococcic infection. Conditions of this kind demanding treatment in ophthalmology are rare. Moreover the difficulties of producing an active antistreptococcic serum are even greater than for the pneumococcus. The same applies to the staphylococcus.

Serum therapy is a fruitful field for scientific research and deserves further investigation.

A. K.

XIV.—**The Combined Treatment in Diseases of the Eye.** By G. HERBERT BURNHAM, M.D., Prof. of Ophthalmology and Otology at the University of Toronto. Published by H. K. Lewis, London, 1906. 92 pages.

This monograph is on a line of treatment for certain diseases of the eye which Dr. Burnham has developed into a routine method. The "combined treatment" consists in the administration of pilocarpin, mercury, and iodide of potassum. Pilocarpin is given hypodermically in doses from gr. $\frac{1}{15}$ to gr. $\frac{1}{4}$. The injections are repeated daily for six weeks in the severe cases. In ordinary cases the injections are continued 10 to 21 times. After a pause the course of injections is repeated. The treatment can be continued for years as long as there is an improvement in the eye-condition. In the author's opinion, timidity in the use of pilocarpin is groundless. The unpleasant effects are due to the liver rather than the heart, and disappear on the continued use. Careful directions are added on the best method of giving the sweat, on the arrangement of the bed, and on the general management of the patient. The adjuvants of this treatment consist in a combination of mercury and the iodide of potassium. The mercury is given as follows :

℞ Hydrarg. cum cret., gr. j.
Pulv. opii, gr. $\frac{1}{10}$
Pulv. ipecac., gr. $\frac{1}{10}$. M.

One tablet to be taken three times a day. The iodide of potassium is given in doses of five to fifteen grains three times a day.

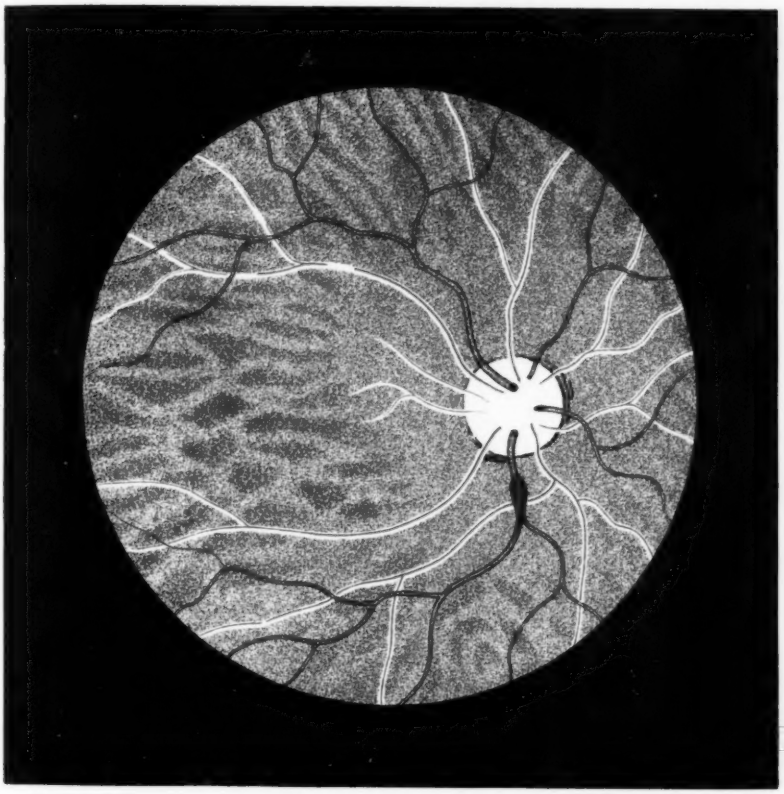
To obtain the best results with the combined treatment, a routine of administration must be methodically followed in every particular.

The rest of the book is given over to a description of many forms of ocular affections which were improved by this treatment in the author's hands. Among these diseases are cases of iritis, irido-cyclitis, optic neuritis, various forms of corneal diseases, corneal ulcerations, and keratoconus. The remedy has not been of any avail in detachment of the retina.

We owe Dr. Burnham a debt of gratitude for this careful description of a line of treatment which possesses such great physiological possibilities. We would especially call attention to the importance of a routine administration insisted upon by the author. In the reviewer's experience during the past winter, this treatment in four cases of sympathetic iridocyclitis, followed out more or less on the lines laid down by Dr. Burnham, has given very satisfactory results.

A. K.

Plates A, B, from Volume LVI. of the *Archiv für Augenheilkunde;* to accompany Dr. Frank Judson Parker's article on *Quinine Amaurosis* in the ARCHIVES OF OPHTHALMOLOGY, Volume XXXV., No. 5, (September, 1906).



Parker, Chinin-Amaurosis mit Bericht über einen Fall.

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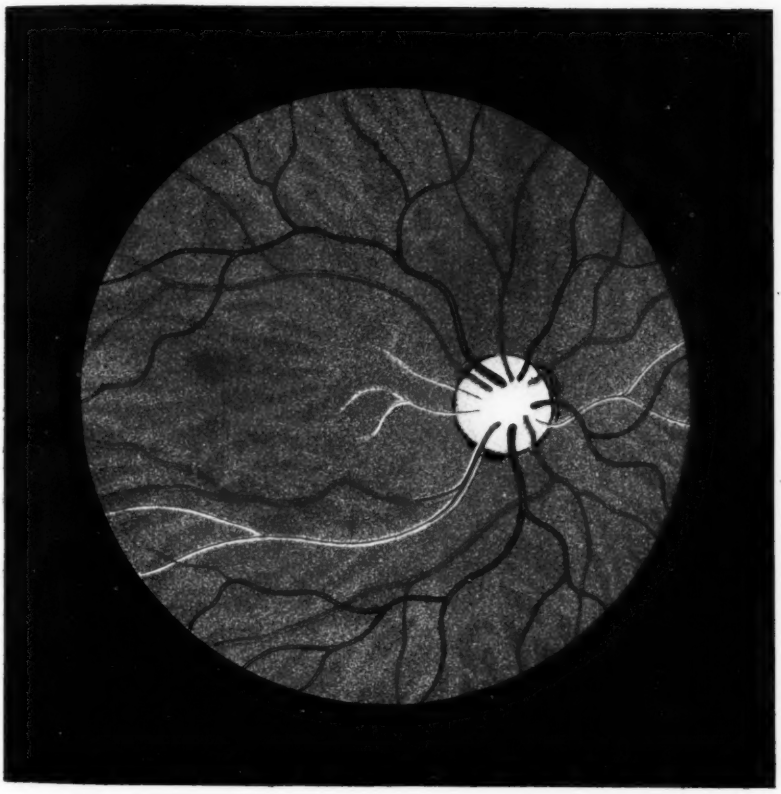

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